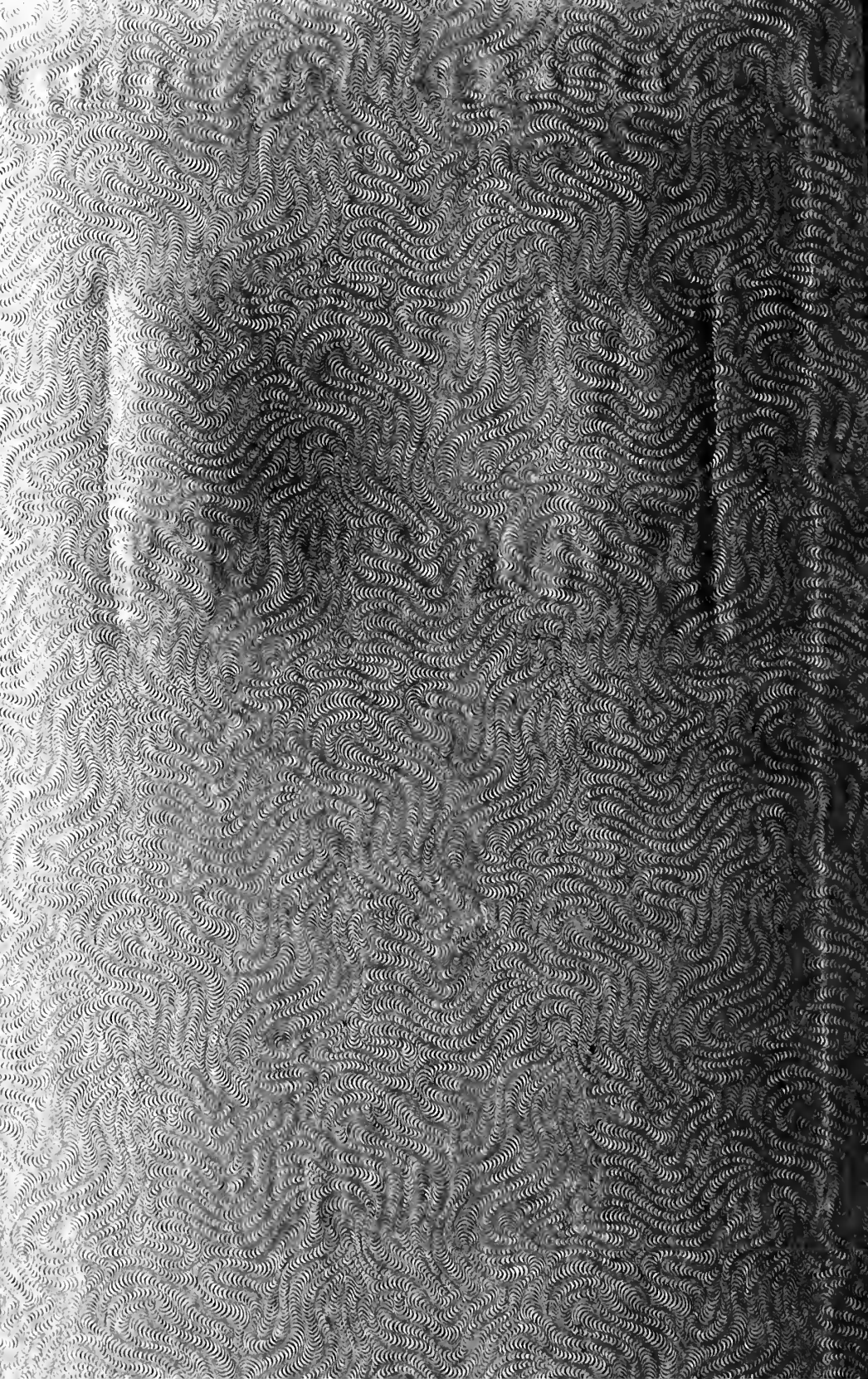


BROOKLYN BOTANIC GARDEN

PLANTS
&
GARDENS



PRUNING TECHNIQUES

PLANTS & GARDENS

BRUCE F. WHITE
GARDEN EDITOR



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PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD

PRUNING TECHNIQUES

1991



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PRUNING TECHNIQUES

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***PLEASE NOTE:** To make all four issues of each volume of *Plants & Gardens* appear in the same calendar year, we've renumbered this issue. This issue replaces Vol. 46 No. 4.

FOREWORD

Plants are vital to both our physical and mental health. Plants also can increase property values significantly — if, that is, they're properly pruned for beauty and bounty, vigor and longevity.

Unfortunately, proper pruning is perhaps the least understood of all human endeavors.

Paint peels; cars won't run; dresses don't fit; your prescription is for hangnails instead of gout...Most folks immediately recognize that the painter, mechanic, dressmaker or physician has goofed.

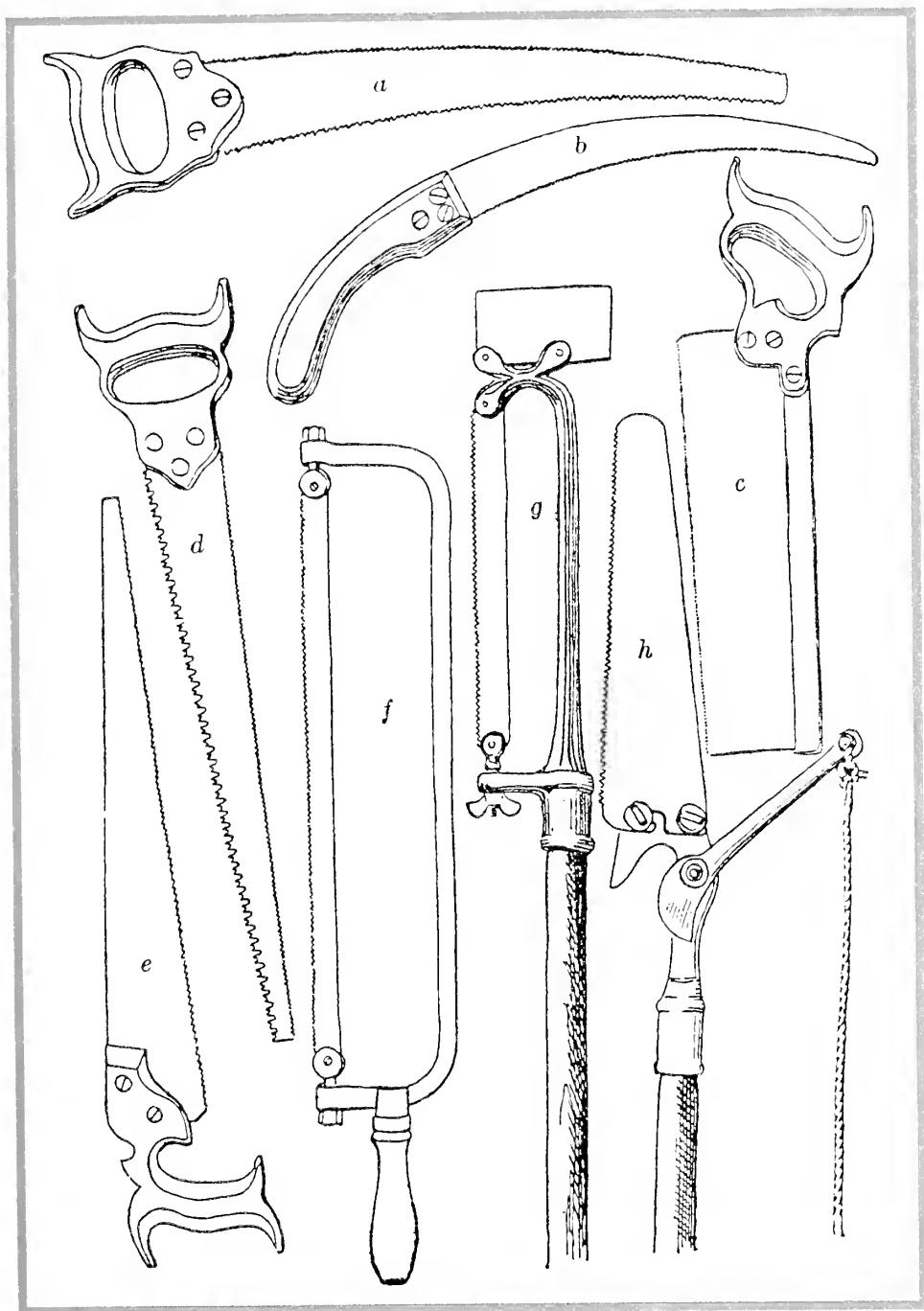
But an untrained tree worker mutilates a 200-year-old oak; a homemaker shears all shrubs and small trees into grumdrops; a mower scalps bluegrass thin as a cheap bath towel. And yet most folks, it sadly seems, view such reprehensible work with misguided appreciation.

Basic proper pruning is not instinctive. It must be learned, just like basic proper painting, auto repair, dressmaking and medicine. This handbook is intended to provide basic knowhow; we've included a glossary to make learning proper pruning technique as simple as possible. Give it a try.

Yet pruning can be more than just "basic" and "proper." Transcendent proper pruning adds an element of artistry; an element not essential for plant health and function, but essential to the ultimate aesthetic touch.

Possibly, this handbook, in addition to giving the basics, will awaken your latent artistic pruning talents. Give this a chance, too.

ALAN D. COOK
GUEST EDITOR



An assortment of antique pruning tools.



This lacebark pine, *Pinus bungeana*, has been pruned to expose the attractive bark.

REASONS & SEASONS FOR PRUNING

ALAN D. COOK

Pruning is the removal of a part or parts, living or dead, of a living plant. There are several reasons for pruning, including the following:

❶ To maintain the "natural" appearance of a plant. Sometimes this enhances, sometimes it defies, a plant's natural tendencies. (An old nurseryman once remarked, "We have to prune the dickens out of this variety to keep it looking natural.") This can include striving for natural appearance in extreme miniature, as in bonsai.

❷ To create and maintain an unnatural

appearance of a plant. Examples are sheared hedges, sheared individual plants (gumdrops) poodle-tailed shrubs, topiary figures, espaliers, pollarding and pleaching.

❸ To limit the size of a plant (keep it "in bounds").

❹ To enhance plant health by removing dead, badly damaged, diseased and/or insect-infested parts of plants.

❺ To improve plant structure (and thus enhance health), especially trees and large shrubs, by removing crowded branches, crossing branches, branches with narrow (weak) crotch angles and shoots in competition with main leaders.

❻ To remove undesirable growth that detracts from a plant — especially suckers and watersprouts.

❼ To display attractive bark on trees and large shrubs by pruning off some lower branches.

❽ To maximize attractive bark on smaller shrubs by cutting back severely during dormancy to promote strong new shoots annually.

❾ To improve or maintain flowering by removing spent flowers, especially on flowering plants which do not have attractive fruit, such as lilacs, rhododendrons and many herbaceous plants.

❿ To improve or maintain fruiting (especially edible fruits).

⓫ To rejuvenate old shrubs.

⓬ To increase safety to humans by removing branches that obstruct traffic signs and signals, oncoming traffic and so on.

⓭ To remove limbs that might fall on people and property.

⓮ To remove low-hanging limbs, protruding thorny branches and other plant conditions that pose hazards to human motion on foot or by vehicle.

⓯ To obtain materials for decorative purposes, such as floral arrangements and holiday decorations.

ALAN D. COOK, *Director of Extended Services at the Dawes Arboretum in Newark, Ohio, is the Guest Editor of this handbook.*

Seasons for Pruning

In some areas, recommended pruning seasons for certain species may be influenced by possible insect and/or disease problems. White oaks, for example, in some areas may be susceptible to oak wilt disease if pruned prior to summer. Check with local authorities.

Winter is a good time for arborists to prune large trees, and for nonprofessionals to prune shrubs and small trees. The absence of deciduous foliage at this time of year helps make the material to be pruned more visible and reduces cleanup chores. More specifically, early spring, before new growth (including swelling of buds), is the best time for this kind of pruning. Early spring also is the best time for severe rejuvenation pruning of shrubs (see “Pruning Deciduous and Needled Evergreen Shrubs,” page 36), including shrubs with colorful bark for beauty next fall and winter.

Some trees, including maples, birches, walnut, dogwood and fruit trees, “bleed” sap profusely if pruned in early spring. This is unsightly but causes little or no harm to the trees. If such a tree needs serious pruning, a temporary aesthetic setback is a small price to pay.

Roses and other summer-blooming shrubs respond well to early spring pruning.

In general, pruning in early spring promotes vigorous new growth. On the other hand, response to pruning during the period of new growth later in spring is poor, because food reserves in roots and stems are low at this time. Avoid

extensive pruning, such as cutting to the ground for rejuvenation, during this period of burgeoning new growth. Heavy pruning at this time weakens plants, sometimes fatally; pruning should be minimal — for example, to remove a broken branch.

Late spring is the time-honored season for pruning spring-flowering shrubs and trees — that is, after they blossom — because the floral display is least impaired. However, if the plants are overgrown and densely twiggy, a good pruning job in early spring may be best in the long run.

Response to summer pruning is much less vigorous than to early spring pruning. Thus, summer is the season to remove suckers and watersprouts, and to do pruning aimed at keeping plants in bounds, because growth response is moderate. Avoid severe pruning, especially of weak plants, in summer.

Hedges and topiaries are good candidates for summer pruning, as are shrubs in foundation plantings. Summer pruning of fruit trees is useful to minimize rank growth that can complicate harvest.

Fall pruning is usually confined to removal of diseased and insect-ridden parts and dead wood. Vigorous fall pruning of woody plants may result in new growth which hasn’t had enough time to harden before winter. Especially vulnerable to freeze damage due to late pruning are roses, azaleas and hollies, especially plants of borderline hardiness in a given zone.

Of course, fall is the time to cut back herbaceous perennials, except those of evergreen persuasion. 🌱

PRUNING TREES

R. A. BARTLETT

Pruning shade and ornamental trees involves the removal of dead, dying, diseased, damaged, insect-infested and/or superfluous branches. (It also involves severing roots for various reasons, a subject covered

elsewhere in this handbook.) What follows is an overview of pruning the above-ground portions of trees.

General Rules

Don't prune without first considering its effect on the overall physiology of the tree. It is easy to weaken a tree by employing improper techniques, by removing too much at one time and/or by pruning at the wrong time of year.

R.A. BARTLETT is Chairman of the Board of Directors of E.A. Bartlett Tree Expert Company in Stamford, Connecticut. He was instrumental in the establishment of Bartlett Arboretum at the University of Connecticut.



Cut dead branches as close to the living branch collar as possible. Do not injure living tissue.



If you cut too close, wound-wood will not form properly, providing an entry for decay organisms.



Branch collars are large on some trees as shown here. Sizes can vary even on the same tree.

Each pruning cut must be made correctly with an appropriate tool, recently sharpened and in good operating order.

As a rule of thumb, do not remove more than one-fourth of the live branches at one time, or more than one-third in one year. Removal of greater amounts of a tree canopy will reduce photosynthetic capacity and deprive the tree of sufficient food for healthy growth. Removal of large amounts of foliage also exposes the inner bark of thin-barked trees, inviting sunscald.

As for timing, see "When to Prune," below.

Reasons to Prune

The primary reasons to prune trees include safety, sanitation and health, enhancement of character and beauty, guidance or restriction of future growth and opening up a view or views.



Codominant stems grow at the same rate from the same point, making a fork — without a branch collar.



The stem bark ridge is the key to pruning one of two codominant stems. Do not leave stubs.

Safety is the most widely recognized reason to prune trees. Branches that are likely to fall or break should be lightened or completely removed, unless they can be supported. Dense crowns that catch wind like a sail should be thinned to enable strong winds to pass harmlessly through.

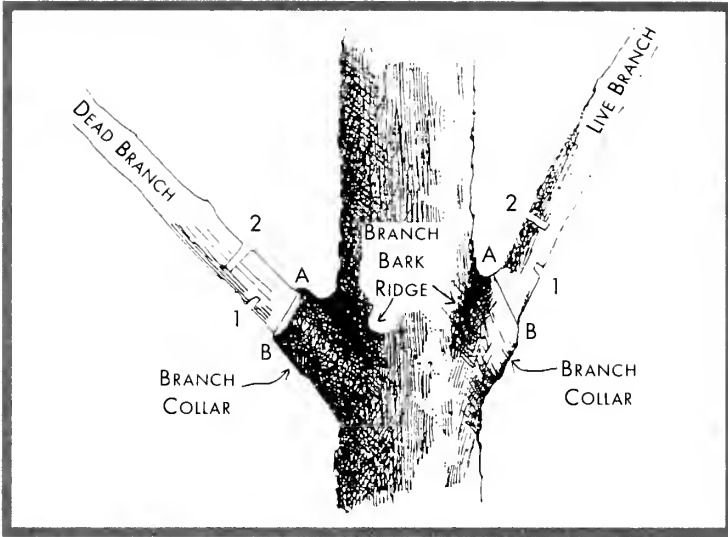
Young trees should be trained not only so that they assume the characteristic silhouette of their species, but to eliminate future weak junctures of branches and trunks.

Sanitation pruning means the removal of dead and dying branches and of insect-infested and diseased wood. Suckers (upright shoots from the base) and watersprouts (upright shoots arising from branches) should be removed to divert the plant's energy toward desirable branches and strong overall growth.

Thinning a dense crown allows light and air to penetrate, which reduces the



The "no" line illustrates an improper cut. For proper wound closing, cut along the "yes" line.



Hardwood

possibility of insect and disease problems, while also reducing the tree's demands for water and nutrients during periods of stress.

Space restrictions (trees planted too close together or too close to structures, rights-of-way or utility wires) tax the skill and artistry of arborists. In some cases, such as beneath wires, it is better to remove a tall- and fast-growing species and replace it with a more suitable tree.

Pruning for vistas is popular where trees block views of mountains, water scenes and the like. However, it takes considerable skill to open "windows" for the enjoyment of such splendor without disfiguring the trees.

A Word of Warning

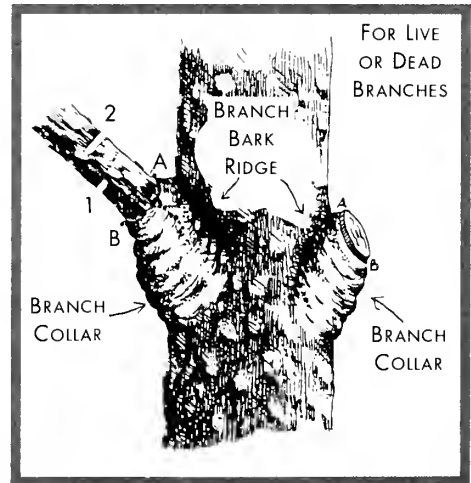
Before describing some basic pruning techniques, I should emphasize that gardeners should not prune trees without proper training and full use of safety equipment.

Never attempt to prune trees from a ladder. Keep both feet firmly on the ground, and never prune any heavy

branches higher than your shoulders. If it is necessary to leave the ground to prune, call in a professional.

Basic Tree Pruning Techniques

When removing branches, alive or dead, be careful not to cut or otherwise injure the branch collar, the bulge of growth on the trunk at the base of the branch. (See drawing.)



Conifer

REMOVING LARGE LIMBS

Let's define a large limb as one you cannot hold easily in one hand when you sever it from a tree with a saw in the other hand. Experience quickly demonstrates that a large limb, thus defined, is not all that large.

The way to remove a large limb, without tearing bark and even wood that should have been left intact, is by the three-cut method.

First, make a cut about a foot away from the point of attachment on the trunk (or larger branch) of the branch to be removed; cut from the bottom, about one-third of the way through the limb, or until the saw starts to bind as weight of the branch squeezes the kerf.

Then, about two inches farther out, cut through the branch so it falls away,

leaving a stub. This technique is called a "drop cut," and should result in the branch dropping more or less straight downward.

The third cut removes the stub just outside the branch collar at the proper angle (equal to and opposite from the angle of the branch bark ridge).

A "jump cut" begins with the first cut made as described above. The second cut is made about two inches closer to the trunk. The cut end of the branch should spring up and away as it falls.

Then proceed with the third and final cut as described above. (See sketches.)

Note the use of "should" in both procedural descriptions above. Be ready for anything — always — when cutting large limbs.

If the branch collar is indistinct, make the removal cut at an angle equal to but opposite that made by the branch bark ridge, the darker ridge of bark which forms above the intersection of trunk and branch. (See drawing.)

All but the smallest branches require a series of three cuts (as shown in the drawing). The first is an undercut made from six to twelve inches out from the trunk, and one-third or more of the way through the branch. (If your saw begins to bind, you've cut far enough.)

The second cut is downward, about three inches farther out on the branch from the undercut. Continue this cut until the branch falls away. Heavy

branches that are apt to damage lower branches or something on the ground should be secured by a rope or two prior to the first cut, and lowered safely after the second cut.

The third (and final) cut starts at the top, just outside the branch bark ridge, and should be angled slightly away from the trunk to remove the branch without damaging the branch collar. Never leave a stub, or make a flush cut. Both will prevent proper closing of the wound, and will provide easy entry for insects and disease organisms.

Do not paint or coat the pruning wound, with the possible exception of a thin coat for cosmetic purposes. Years

ago, painting was a revered practice. Today we know it serves no useful purpose and in some cases can even hold in moisture and foster decay.

Small branches, suckers, watersprouts and ends of conifer branches can be removed with a single cut with a sharp handsaw, pole pruner, pole saw or hand shears.

It is unwise for nonprofessionals to use chain saws and/or flexible chain

devices on cords advertised for cutting overhead branches.

When to Prune

Trees can be pruned at any time of the year, with one exception—severe pruning (removal of more than one-fourth of the crown at one time) should not be done in early summer, when food reserves in trunks and roots are low.

PLASTIC BANDAGES FOR TREE WOUNDS

So paint does not help tree wounds. Then what can we do?

For sizable wounds on tree trunks, such as those caused all too often by car fenders and bumpers, wound closing can be aided by black plastic bandages thick enough to exclude light.

If applied soon (within two weeks, tops) after the wound was inflicted, 4-mil black plastic, or several layers of thinner material, will speed wound closing and reduce decay of exposed wood, according to research by Drs. Alex Shigo and Walter Shortle of United States Department of Agriculture Division of Forestry.

Applied more than two weeks later, the plastic bandage will reduce decay, but not accelerate wound closing.

One arborist in Ohio has used black plastic electrical tape, wrapped completely around the tree trunk at top, middle and bottom, to effectively secure the "bandage."

After one year, the bandage should be removed.



Wound dressings do not stop decay — some dressings encourage it.

PHOTO BY ALEX SHIGO

TOPLESS TREES ARE INDECENT

PHOTO BY ALEX SHIGO



Topping destroys a tree's beauty and shortens its life.

If a tree is growing too large for a given site, it's the fault of the person who planted it there. Proper pruning can help allay the size problem, especially if started early in the life of the tree.

Topping does not solve the size problem. But it does create new problems.

The immediate result of truncating a trunk or large limb is either dieback or prolific vigorous upright shoots from below the cut, forming a "broom."

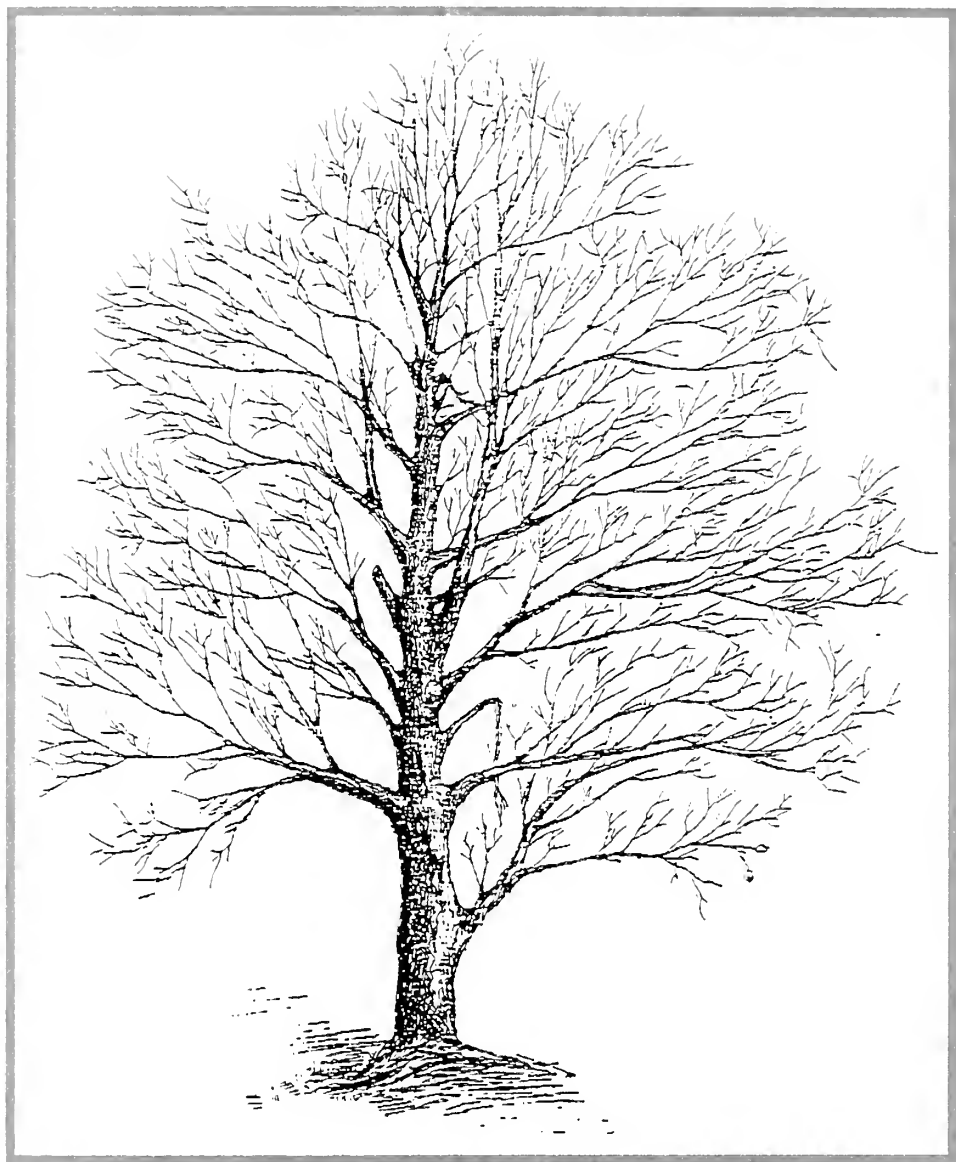
These new shoots arise from just under the bark and thus are poorly attached and easily broken off by wind.

Indeed, a few years after topping, not only may a tree be as tall as before, but density of branches and foliage may even be greater. Consequently, there's more wind resistance, and the entire tree is more vulnerable to breakage or uprooting.

The monetary value of a tree, and thus of the entire property on which it grows, is reduced by topping.

Life expectancy of the tree is lowered, usually by at least one-third. Stressed, weakened trees may die a year or two after topping.

However, perhaps the greatest insult of the topping crime is the loss of a tree's beauty, majesty and dignity.

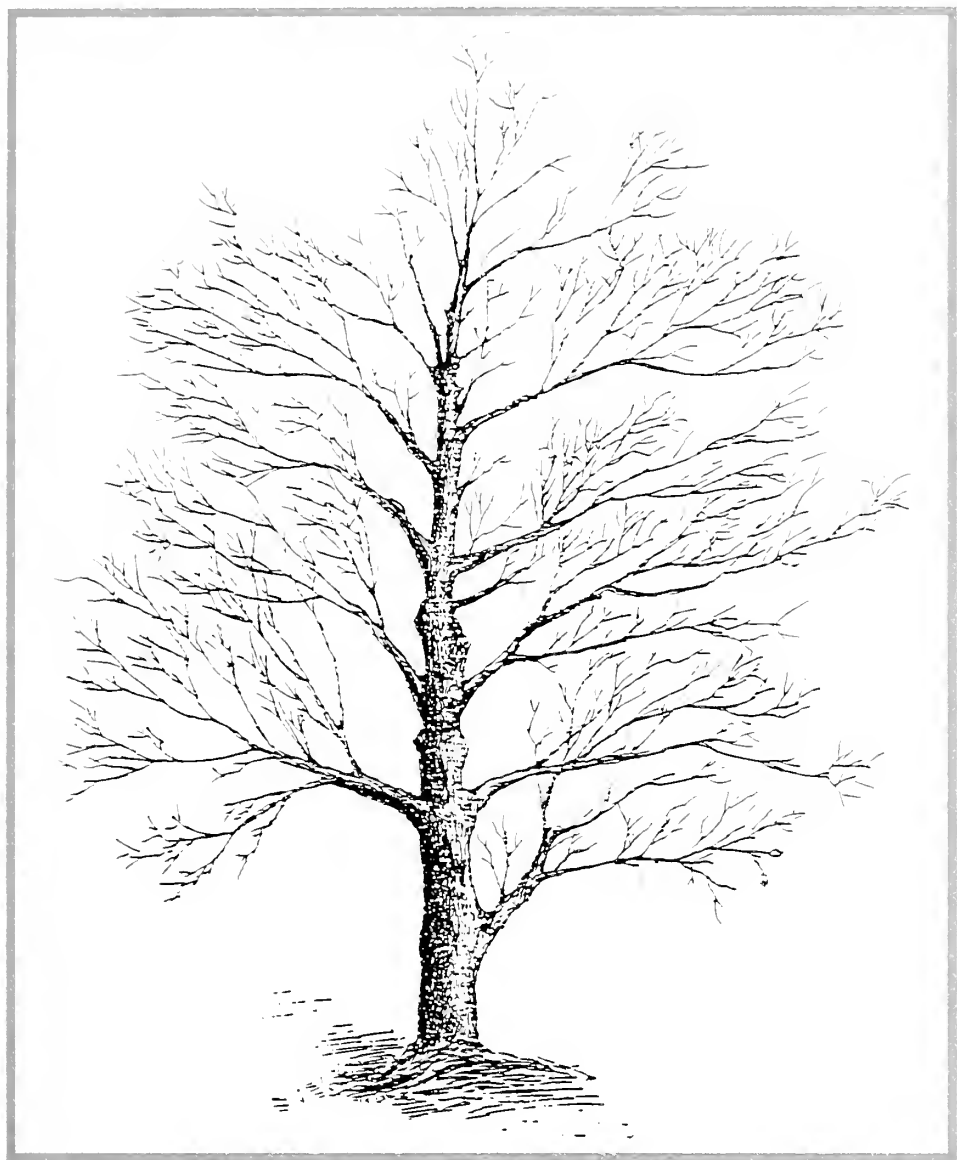


Before pruning.

A few trees bleed (ooze sap) when pruned in late winter and early spring, but this is more unsightly than harmful. Trees that bleed readily include maples, birches, black walnut and flowering dogwood.

Trees that flower in spring should be pruned immediately after flowering, so that next year's flowering is not reduced.

Trees damaged by storms should be pruned as soon as possible after the dam-



After pruning.

age, to induce wound-covering new growth without delay.

Winter pruning makes it easier to see the proper locations to prune, since at this time of year they are not obscured by

foliage. Winter pruning also is usually faster and less costly because fewer precautions are required to avoid damage to lawns and gardens, and cleanup is easier without leaves.

HOW TO HIRE A TREE-CARE PRO

STEVE SANDFORT & EDWIN C. BUTCHER

You hear a knock on the door. The person standing there explains that his tree company is in the neighborhood and he noticed a problem with your tree. He says he does good work at a low price; he might even show you a business card claiming he is "Fully Insured." Should you authorize him to work on your trees? If you do, both you and your trees stand a good chance of getting the clipping of your lives.

According to numerous studies, your landscaping — especially trees — can contribute up to 20 percent of your property value. Rather than paying a fly-by-night tree service to mutilate (one of the authors would rather not use the word "butcher"!) your trees, you'll be dollars ahead if you hire a professional tree service. You get what you pay for!

Most homeowners fail to look up at their trees. You should regularly look for dead

limbs, discolored leaves, leaves that are smaller and/or more sparse than normal. These symptoms usually indicate problems.

How do you select a professional tree service? That can be difficult. The Cincinnati Yellow Pages lists about 65 tree-service companies, and there are probably another 65 unlisted ones cruising the area. It is a well-known fact that as unemployment increases, so does the number of tree "experts."

A general rule of thumb is that good, reputable tree-service companies do not need to solicit business door-to-door. They stay busy with repeat customers or recommendations from satisfied clients. Professional tree companies report about six weeks of backlog in summer and two weeks in winter. With this much work, there's simply no time to solicit door to door.

Call a tree service recommended by several of your friends or neighbors. Some cities have a local Arborists Association that you can call for recommendations. Usually only the better companies are members.

If no one can recommend a company, look in your Yellow Pages under "Trees." The better companies are members of one or two professional organizations.

The National Arborist Association restricts membership only to tree-service companies whose work is of high quality and ethical standards.

EDWIN C. BUTCHER is founder and president of Madison Tree Service in Cincinnati. He is a former Associate Professor of Arboriculture at Cincinnati Technical College, and has given talks on arboriculture to professional groups in the U.S. and abroad.

STEVE SANDFORT is Supervisor of Urban Forestry for the City of Cincinnati, Ohio. In addition to running an exemplary urban forestry department, Sandfort has authored an award-winning tree book for the general public and numerous articles for professional journals.



Most good tree-service companies have clean, modern equipment.

Membership in the International Society of Arboriculture is open to individuals practicing tree work or working in a closely related field — forestry, research, teaching or managing tree-covered cemeteries, campuses or arboreta.

Member companies of either of these organizations and/or their local chapters are usually up to date on theories and methods of tree care. However, as with members of any profession, arborists may offer differing opinions of what is wrong with your tree and how to treat it. Therefore, it is always wise to get a second or third opinion from other tree companies, especially if a large sum of money is involved, or if the tree in question is extremely valuable.

In many areas, there are competent individuals who do not sell or perform any tree-service work but who, for a fee, will consult with you about your tree problem. Many of these private consultants belong to the American Society of Consulting Arborists. Quite often city foresters, electric utility foresters or similar professionals perform consulting services in their off-time. Consultants can provide you with unbiased opinions and later check the work for quality and completeness before you pay the bill.

Most good tree-service companies have clean, modern equipment that is kept in good repair. Their employees are generally neat and polite. Reputable companies provide all types of tree care

including pruning, fertilizing, mulching, cabling and bracing, lightning protection and pest control.

The professional approach is to first try to save the tree, and to recommend removal only as a last resort (especially if a tree poses danger to life and property). If a tree's problem is not serious and needs no treatment, they will even tell you that!

Never will a good company use boot spikes (gauffs) to climb a tree that is to remain in your landscape. Using spikes is in direct conflict with all arboricultural standards.

Only on rare occasions do reputable companies recommend or perform topping of trees. What would you think of a marine biologist who advocated chopping the tails off whales because whales get too long? Look around your city and see how many homeowners have fallen prey to the old snake-oil line that goes: "We'll top your tree because it's getting too tall."

Trees are supposed to be tall. Topping (pollarding, stubbing off, hatracking, dehorning) is almost never recommended unless a tree has suffered drastic damage from, for example, a tornado or plane crash. Then the cuts are made to minimize further death or rot in remaining branches.

Routine topping, as advocated by the quacks of the tree-service industry, usually results in dead trees or large truncated branches that cannot callus over their horrible wounds. These huge stubs begin to rot while small sucker sprouts begin to grow around the edges. As the rot gets more serious, the sprouts get heavier and finally crash to the ground when the rotted wood can no longer support their weight.

Topping a tree ruins its natural beauty and severely shortens its life expectancy. Severe topping of a tree already under stress, and/or at a time when carbohydrate reserves are low (late spring, early summer) may result in almost immediate death.

If a company advertises topping or

suggests doing it to your tree, consider that company no further. If it is necessary to reduce the weight or size of the top of a large tree, a good arborist can prune 50 percent of the wood out so that only a skilled eye will be able to detect that the tree was even pruned. This type of professional pruning leaves a tree looking like the beautiful creation it is and greatly extends the tree's life by eliminating dead, weak, diseased, splitting or rubbing branches.

Before allowing a tree-service company to work on your property, obtain copies of the company's certificates of insurance and workman's compensation (or the equivalent in your state). Do not rely on the company's business card or Yellow Page ad claiming it is "fully insured."

A certificate of insurance looks much like the single sheet you receive from your automobile insurance company explaining the limits of your liability, collision and medical coverage. This certificate proves that the tree-service company is insured in the event its activities damage your property. Damage can range from a crushed shrub to a totally smashed house, but if the company is insured, its insurance will pay.

Before the work starts, phone the insurance carrier to make certain that your chosen tree service is still covered.

State workman's compensation pays the medical and long-term disability costs of any tree-service-company employee who is injured on the job. Remember, tree work is highly hazardous. In some states, if an injured employee of a company without workman's compensation cannot get enough money from his employer to pay medical bills, that worker can then turn to the property owner for compensation.

Some property owners think their homeowner insurance will cover them in such a case, but not all homeowner poli-

cies do. If they do, the maximum limit is far less than the amount for which the injured worker may sue you.

The fly-by-night tree "expert" will most likely quote you a cheaper price for the work than will a reputable company, but remember, you get what you pay for. Paying for liability and workman's compensation insurance is very expensive, and only the best, most professional companies carry sufficient insurance. It costs over \$100,000 to initially hire, equip, train and insure a three-man crew and at least \$80,000 per year to keep a tree service going thereafter. These costs, plus the costs of memberships in and technical training sponsored by professional organizations, all have to be built into prices charged by good tree services.

Though it is wise to get more than one estimate, you should not expect good tree-service companies to engage in a bidding war. Most have established hourly rates, and sound estimates are based on those rates.

Once you decide on the company, the type of work to be done and what it will cost, get all your promises in writing. The good companies will submit a proposal that states:

- What date the work will begin.
- Exactly what work will be done. For example, prune all dead, dying, diseased and weak branches one and one half inches or greater in diameter.
- What you need to do, such as remove lawn furniture, keep children and pets indoors, etc.
- What cleanup work will be done and when. Do you keep the wood, and if so, how will it be left — cut into 16 inch lengths and stacked by the garage? Does the removal of a tree include grinding out the stump and surface roots to one foot below grade, replacing all chips with topsoil and then sowing grass seed? Unless otherwise specified, most estimates are based on removal to near ground

level and not grinding the stump.

- What date the work will be finished.
- The total dollar amount you will be charged. This is important in order to avoid misunderstandings such as:

"Here is the \$300 I owe you for my five trees."

"\$300? Sorry, lady, that was \$300 per tree!"

Never pay in advance. All good companies will bill you, but you should pay that bill promptly if the company performed properly. If there is a problem, immediately call it to the attention of the company's sales representative or president. Don't pay until all the work and any necessary corrections are done to your satisfaction or that of your consultant.

Another tree-mendous tip to consider in obtaining the most cost-effective tree work is to schedule as much work as possible for the winter months. Most tree work can be done as well or better in the winter. However, few people think about their trees then, so it is usually a slow season for tree services. Quite often companies will offer slightly better rates to encourage off-season work.

In addition, see if any of your neighbors have been thinking about having tree work done; then get bids from several reputable companies for all the work at the same time. Combined with lower winter rates, group discounts can result in savings of 10 to 15 percent!

Your shade trees are nice to have around! There are a lot of folks willing to put a chainsaw to them for a fast buck. There are also professional companies whose reputations talk for them.

Allowing the wrong company to work on your trees can turn out to be a costly mistake. Don't let it happen to you. Using your common sense and the helpful hints outlined here will almost guarantee that cost-effective, quality tree work is performed on your property with little risk to you or your trees.

PRUNING ROOTS

ALAN D. COOK

Four kinds of root pruning are discussed here: pruning girdling roots, pruning raised roots, pruning to reduce a plant's vigor or growth and pruning before transplanting.

Girdling Roots

Sometimes a misguided root grows at right angles to the radial direction of normal roots. If this happens close to the trunk, girdling (squeezing) can occur as trunk and root expand with time. Trunk expansion is then reduced, sometimes severely, causing eventual flattening of the trunk above the girdle. In severe cases, this can result in severe loss of tree vigor.

This unhappy condition occurs among trees grown too long in round containers in nurseries, leading to circular root growth. And sometimes trees transplanted bare-root will produce girdling roots, especially if roots are forced into an undersized transplanting hole. Maples, especially Norway maple, *Acer platanoides*, seem prone to girdling roots.

Girdling roots should be cut away as soon as you see them, as close to their points of origin as possible. Considerable

soil removal may be necessary to expose the girdler.

Saws are often awkward to use in constricted spaces, and moving contact with soil will dull saw teeth rapidly. Sometimes a sharp axe is appropriate, but usually a hammer and chisel work best.

Raised Roots

Many tree and some shrub species generate raised roots, especially in heavy soils. Mowing and walking over exposed roots are not much fun. Mulching and use of groundcovers are possible solutions, but sometimes you just want to get rid of the offending root(s).

Pruning exposed roots may be accomplished as discussed above for girdling roots.

Vigorous trees will suffer little harm if a few raised roots are cut and removed. However, removing roots from trees under stress is not wise. There seems to be no formula for the amount of roots a tree can lose without undue harm. So practice restraint.

Root Pruning for Vigor Reduction

Cutting roots reduces vigor of a plant to some degree, and is most often done

on shrubs. A rampant shrub may be kept in bounds by root pruning, especially if judicious thinning and heading back of branches are done at the same time.

PETER NELSON

The job is more or less easily accomplished by thrusting a straight-bladed spade vertically into the soil at points between stem-root juncture and drip line (edge of branch spread).

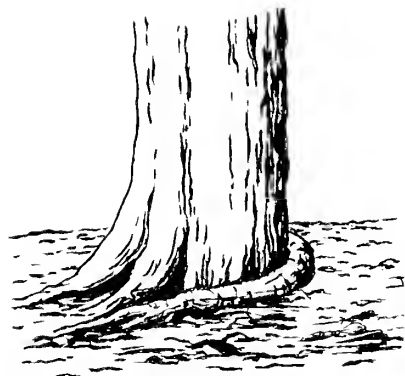
As with removal of raised roots, undue enthusiasm is not recommended.

Pre-Transplant Root Pruning

Pruning roots of a sizable shrub or tree one growing season before transplanting was a common practice years ago. Generally, a trench was dug around the woody plant at about the radius of the proposed transplanting root ball, and about 18 inches deep.

Some practioners used an interrupted trench. Then soil, usually amended with organic material such as humus or peat moss, was replaced. The next season, new roots were expected to have formed in fibrous profusion, increasing the chances for a successful transplant.

This procedure is seldom practiced by professional nursery people today.



Girdling roots can be above or below ground. If flattening of the trunk or loss of vigor is noted, start digging.

TRAINING & PRUNING FRUIT TREES

MARCIA EAMES-SHEAVLY & MARVIN P. PRITTS

During nonbearing early years, fruit trees need some pruning. The emphasis should be on training for tree structure. Special attention should be given to selecting limbs that are well spaced along the trunk of the tree and that have wide angles of attachment. The development of a structurally strong tree with limbs well exposed to full sunlight will greatly reduce the amount of corrective pruning needed during the production years.

Figures 1 through 6 illustrate the principles of pruning.

Apples and Pears

Apple and pear trees should be pruned during the dormant season, which is after leaves have fallen and before growth starts in the spring. The ideal pruning time in

New York State is from February to April.

Pruning cuts on young trees stimulate vegetative growth and delay fruit bearing. Therefore, keep the number of cuts on a nonbearing tree to a minimum, making only those necessary for proper structural development.

At planting, cut back one-year-old unbranched trees to a height of 24 to 30 inches. After new shoots start to grow, remove the second and third shoots from the top to avert narrow-angled crotch development of the permanent scaffold limbs.

When planting a two-year-old branched tree, select a leader branch and three or four well spaced lateral branches for the permanent framework, and remove the other branches. After growth begins, remove the second and third new shoots from the tip of the leader.

Training during the second year depends upon the growth habit of the cultivar. If the cultivar tends naturally to be a spreading tree such as Golden Delicious, remove only the crowding shoots.

Also remove fruits that set on the leader. If fruits are allowed to develop on the leader, it is not possible to maintain the upright position necessary for a

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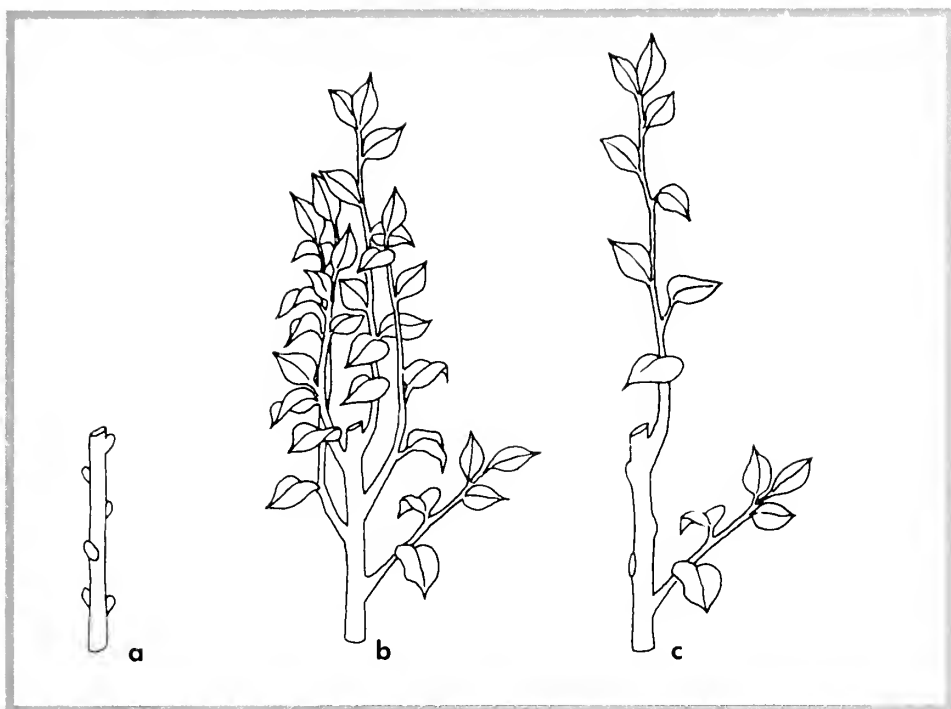


Fig. 1 SUMMER PRUNING OF YOUNG TREE TO ENSURE DOMINANCE OF THE LEADER:

- a)** head back the unbranched whip at planting;
- b)** vigorous shoots develop from the uppermost buds;
- c)** remove shoots that compete with the leader while the plant is still succulent; continue the removal of competing shoots in subsequent years.

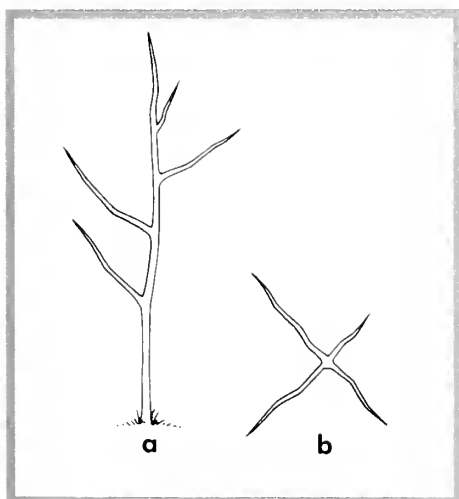


Fig. 2 PRINCIPLES OF

SCAFFOLD SELECTION AND TRAINING:

- a)** a tier of "scaffold limbs" or principal branches that form the tree's framework should be well spaced along the trunk, with no more than one scaffold arising from any point; the first should be at least 18 inches from the ground;
- b)** the tree as viewed from above; note good distribution of scaffolds; keep upper scaffolds smaller than lower scaffolds to maintain proper light exposure of lower scaffolds.

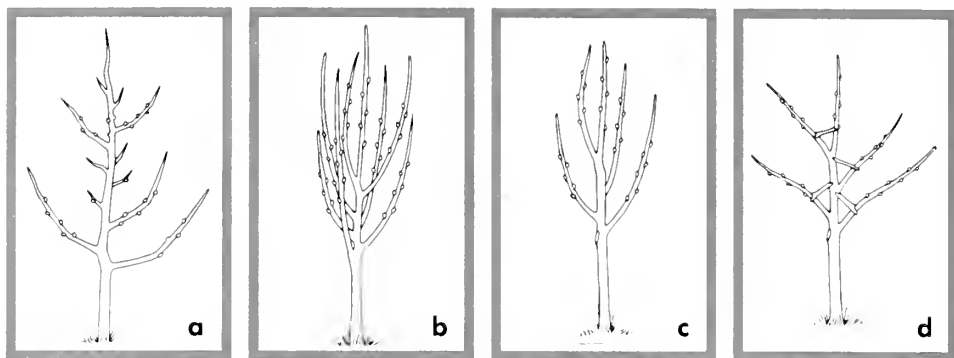


Fig. 3. TWO APPLE CULTIVARS, DELICIOUS AND GOLDEN DELICIOUS, WITH DIFFERENT GROWTH HABITS, AND THE SEQUENCE FOR PRUNING DELICIOUS: **a)** Growth habit of Golden Delicious; note the well-defined central leader, wide-angled crotches, and moderate extension growth;

b) Growth habit of Delicious; note vigorous, upright growth competing with the central leader, excessive number of scaffold limbs, and narrow crotch angles;

c) Delicious after scaffold selection and heading back the central-leader shoot; note spacing of scaffolds along the main trunk;

d) Delicious after insertion of limb spreaders; spreading improves the crotch angle, reduces scaffold vigor, favors flower bud formation, reduces competition with the leader, and eliminates interference of lower scaffolds with the growth of scaffolds originating higher on the trunk.

central leader tree.

For vigorous, upright-growing cultivars such as Red Delicious, remove some of the lateral branches and spread the remaining branches to forty-five-degree angles, either by using wooden sticks as spacers or by hanging weights on the branches.

Try to position the scaffold limbs around the trunk with at least eight inches between the limbs along the trunk. It is important to position these limbs so they do not interfere with the development of other permanent limbs.

Stone Fruits

Stone fruit trees, including cherry, peach, nectarine, plum and prune, should be pruned in late spring. Peach

and nectarine trees are highly susceptible to perennial canker, which is caused by a fungus that infects open wounds during cool temperatures. Delaying pruning until blossom time helps reduce the spread of this disease organism.

Cherry, plum or prune can be trained as a central leader tree as described for apple and pear, or trained with a modified leader, or trained into an open center (vase-shaped) tree.

Training a tree with a modified central leader is similar to training a central leader tree, except that after four or five good scaffold limbs have been selected on the leader, the top is removed.

After initial training, cherry, plum and prune trees need a few corrective cuts

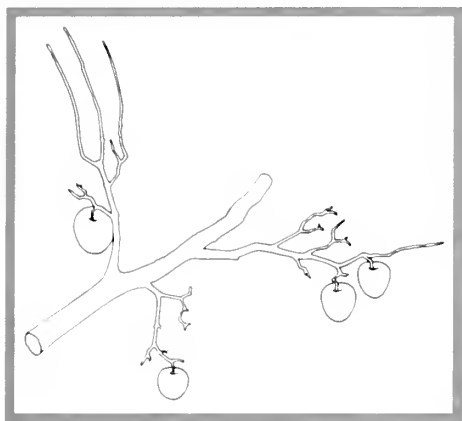


Fig. 4 ORIENTATION OF FRUITING BRANCHES: The upright branch is excessively vigorous, only moderately fruitful, and produces fruits that are often soft and poorly colored; the branch growing from the underside of a larger branch is heavily shaded and, as a result, is low in vigor and fruitfulness and produces small fruits of poor color; the horizontal branch is of moderate vigor and very fruitful, and because of good light exposure, produces fruit of superior color.

during the following five or six years, or until trees begin to bear fruit. During this time, limit pruning to the removal of watersprouts and limbs that cross and rub against a permanent branch.

Prune to prevent the development of bad crotches and weak unions that could split later under the weight of a crop. A bad crotch is a fork where two branches of equal diameter arise at a common point. Generally, one of these branches can be eliminated, but if it seems desirable to save both, cut one of them back severely;

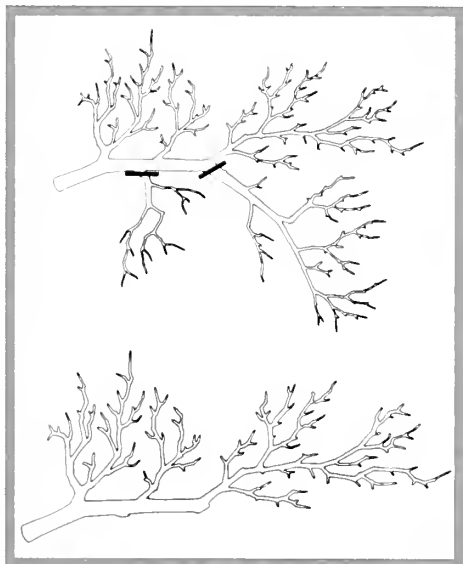
it will then be smaller and develop as a lateral branch to the unpruned one.

Weak unions between the rootstock and the scion are common in some cultivars of fruit trees and most cultivars of sweet cherry. Often, vigorous shoots grow upright against the trunk or against other branches. To prevent this growth, choose limbs that spread out from the trunk at wide angles and remove those that grow upright against the trunk. Only an occasional cut is required, and pruning becomes gradually less necessary as

Fig. 5 PRUNING DROOPING BRANCHES:

Above, branches that droop downward are not well exposed to light and usually shade other branches.

Below, to prune, remove the ends of such branches back to a lateral in a near-horizontal position, and remove all branches growing downward from the bottom of larger branches.



the tree comes into bearing.

Trees that have had proper corrective pruning from the beginning need little if any pruning during their early bearing years. Overpruning during the formative years delays bearing.

Peach trees, because of their growth habit, are not suitable as central leader or modified leader trees. Open center training, selecting only three scaffold limbs, is best for them. One-year-old nursery peach trees are usually three to six feet tall with some lateral branching. Laterals that were developed in the nursery as secondary shoots are generally too weak to make good framework branches. Prune these trees back to a height of 18 to 24 inches and cut off all laterals to encourage the growth of strong shoots on the trunk.

As soon as the shoots have grown a few inches, usually by the first of June, select three of the best shoots that are well positioned around the trunk, four to six inches apart, and remove all others. Equal growth and branching of these shoots results in an open center tree. Occasionally, nursery trees have one or two well-developed lateral branches in satisfactory positions and these can be used as scaffold limbs; then the main stem can be cut back to 30 inches and the laterals tipped off to uniform lengths.

Peach trees require extra attention following the first and second years' growth. The main scaffold branches should be lightly cut, or headed back, to outward-growing laterals. The purpose of heading back scaffolds is to continue the development of an open center tree that will be low, strong and spreading for convenient thinning, pest control, and harvesting. Leave the small shoots that cross in the center because they will bear the first fruits.

Pruning during the third and fourth years should be as light as possible, limited to removing only decidedly crowded limbs or low-hanging shaded branches in

the center of the tree and heading back main scaffold limbs to laterals if they are too high or out of balance with others.

Pruning Bearing Apple and Pear Trees

Uniform vigor of the fruiting wood throughout a tree is ideal. Fruiting wood in the top of a tree, however, has the best exposure to sunlight, which is essential for plant and fruit growth, and is therefore more vigorous than the wood in the shaded lower portion of the tree. Also, orientation of fruiting wood along main lateral branches increases its vigor and fruiting potential.

For apples and pears, a cone-shaped tree intercepts light most efficiently. A cone shape is easy to maintain in a young tree, but is difficult to preserve as the tree ages. The top of a tree, which has the most vigorous growth, tends to spread and shade the lower limbs. When pruning, minimize small cuts, which have an invigorating effect. It is more effective to make one or two large cuts; either remove an entire branch or cut a major portion back to a vigorous fruiting lateral. Remove vigorous upright water sprouts and leave the weakest ones.

In the lower part of the tree, remove limbs that are shaded by other limbs. When limbs are young and fruitful, they are somewhat upright-angled or horizontal. As they become older, they droop and should be taken out. Also, eliminate all broken and crossing limbs.

Rejuvenating Old Apple or Pear Trees

Most old apple and pear trees are too tall for convenient pest control or harvesting. The top one-third of an old tree can be eliminated by making major cuts just above large side branches.

Subsequently, water sprouts will arise in the vicinity of these large cuts. These

should be pruned or pulled during July and August while they are small, to prevent them from eventually shading the center of the tree. During dormant season, remove all strong upright shoots at points of origin. Water sprouts will form around these cuts, too. During the summer, prune or pull the strongest and leave a few weaker water sprouts to provide minimal shade and reduce sunscald.

Prune the lower part of old trees as previously described for bearing trees.

In the second or third season after severe pruning of old apple and pear trees, remove small limbs to create space between fruiting limbs.

Pruning Bearing Stone Fruit Trees

Cherry, plum and prune trees require the least pruning of all fruit trees. Generally they need no more than light heading back to strong lateral branches to keep trees in bounds; thinning out of branches to provide good light exposure for remaining limbs; and removal of dead, broken or diseased growth.

Peaches are borne on the previous season's growth. As trees attain full size, severe pruning renews fruiting wood. Terminal shoot growth of 12 to 18 inches is desirable. If shoot growth is weak or if lower limbs grow too long, cut branches back into two- or three-year-old wood; make cuts to an outward-growing side branch. After heading back all of the main branches, thin and space fruiting branches to six to eight inches apart. This spacing allows good light penetration to fruiting branches and allows development of new shoots for next year's crop.

Fruit Thinning

Fruit thinning, which is the removal of some developing fruits to improve size and quality of those left, is a form of pruning.

Thinning of fruit is seldom warranted

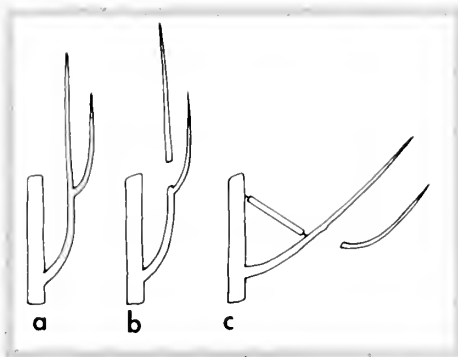


Fig.6.

Training an upright scaffold limb:

a) upright scaffold; note narrow crotch angle and smaller, upright lateral branch; **b)** incorrect procedure; thinning out to the upright does not improve the crotch angle and limb position or control vigorous vegetative growth; **c)** correct procedure; spreading the limb improves the crotch angle and properly positions the scaffold; remove the lateral, for it will be shaded by growth from the main scaffold limb.

on young trees. On mature fruit trees, early and proper thinning results in larger, better colored and higher quality fruit, and also promotes prolific blooming the following spring.

When fruits are clustered, remove all but one in each cluster. Remove small and/or unhealthy fruits first.

Leave potentially good fruits at the following spacings: peaches, four to eight inches apart (somewhat wider spacing for early cultivars); plums and prunes, four inches; apples, four to six inches.

The results are well worth the time invested in thinning.

PRUNING GRAPES & BRAMBLE & BUSH FRUITS

MARCIA EAMES-SHEAVLY

&

MARVIN P. PRITTS

Pruning and Training Grapes

YOUNG VINES

The four-arm Kniffen system (Figure 1) is recommended for training grapes in home gardens, although many other methods can be used. This system employs a trellis made by stringing two lines of galvanized wire (size 9, 10, or 11) or monofilament line between durable wood posts set about 24 feet apart. The top wire should be about six feet high

and the lower (and parallel) wire about three feet high.

During the first year, when new shoots are about ten inches long, remove all but the strongest one and tie it to the bottom wire to hold it erect. Remove all other shoots and flower clusters as they arise, so that a single cane develops.

If the cane does not reach the top wire in the first year, treat the plant as a newly planted vine the following year.

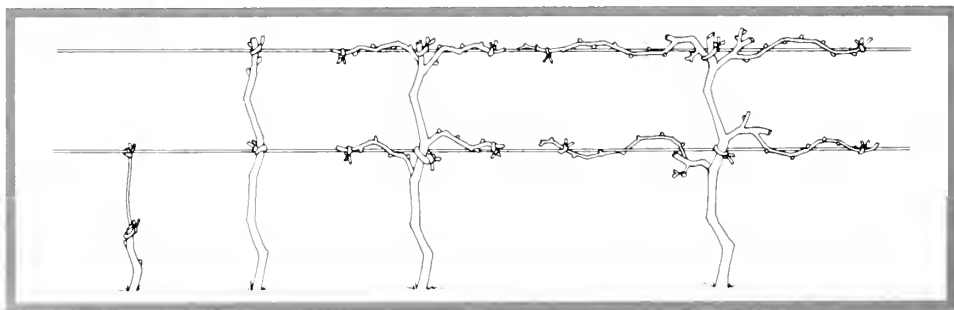


Fig.1. Stages of training a vine to the four-arm Kniffen system on a two-wire trellis.

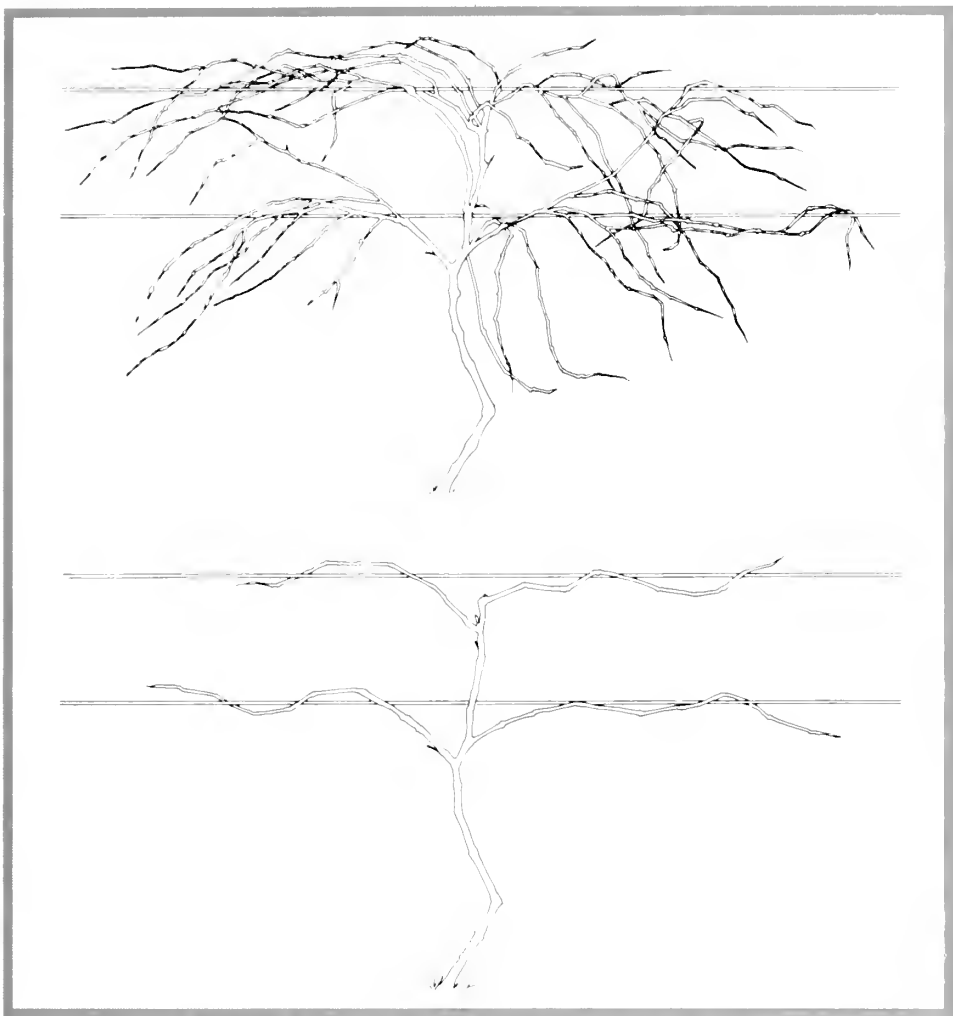


Fig.2. Grapevine trained to the four-arm Kniffen system:
above, unpruned; **below**, pruned.

In late winter or early spring, tie the two-year-old cane to the top trellis wire and cut it off just above the wire. Leave four to six buds in the vicinity of each wire and remove the rest. As new shoots begin to grow from the remaining buds, cut off any flower clusters that form.

In early spring of the third year, before new growth occurs, select a total

of eight canes (four for each wire) and remove the rest. Tie one cane along each wire in each direction. Cut the remaining four canes, two at each wire, back to stubs containing two buds each.

MATURE VINES

In early spring, remove the fruiting canes from the previous year. Tie one of the canes from each stub (left last year) to a

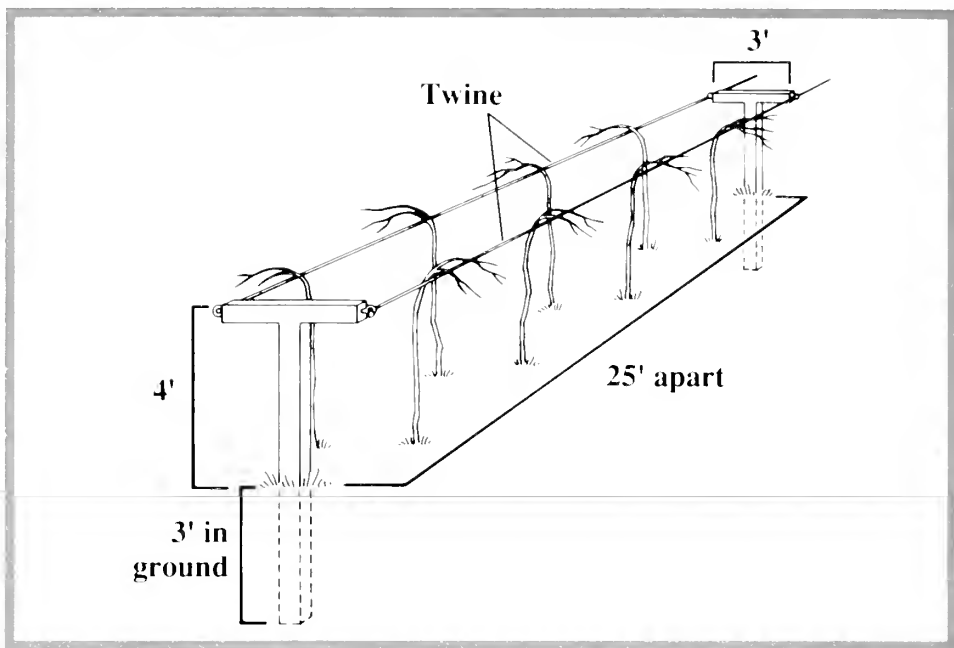


Fig.3. TEMPORARY TRELLIS FOR PRIMOCANE FRUITING RASPBERRY PLANTS.

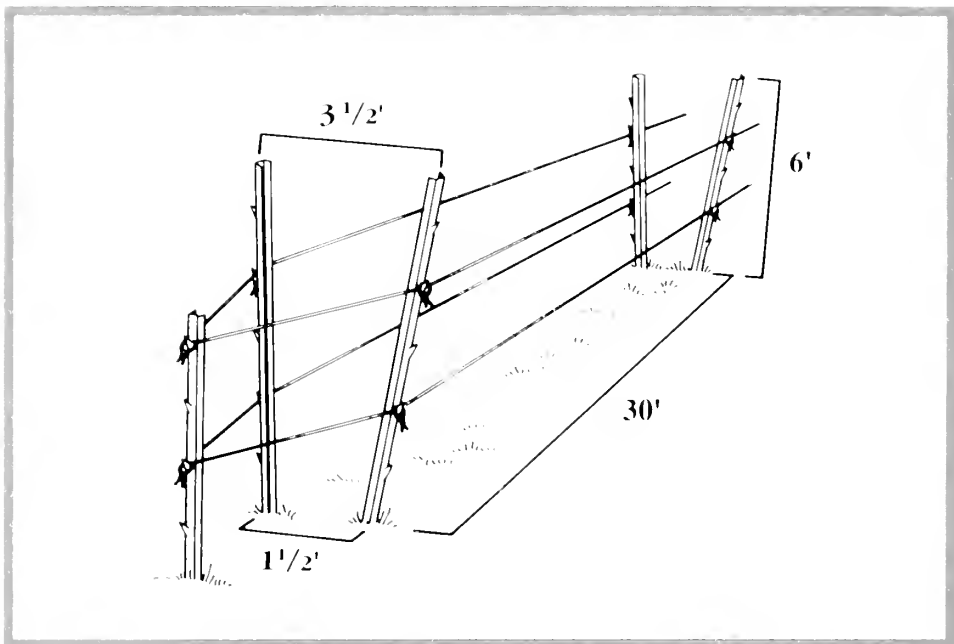


Fig.4. A V-TRELLIS SYSTEM FOR RASPBERRY PLANTS.

trellis wire, one in each direction on each wire, and cut each cane to leave ten buds. These are the fruiting arms for the new season.

Cut the remaining four canes from last year's stubs back to two buds, thus forming new stubs.

In subsequent years, adjust the number of buds left on each arm. Too many buds result in lower fruit quality; insufficient buds reduce yield.

NEGLECTED VINES

To renew old neglected grape vines, prune in stages. The first year, cut away old arms, and allow a few new canes to develop from near the base of the old trunk.

The next year, select one vigorous cane arising from near the base, and tie it to the trellis wires to form a new trunk. Treat this sprout as a newly planted vine, and cut off the old trunk after another season or two.

Pruning Bramble Fruits

TRELLISING

Several systems of trellising are employed by some growers of bramble fruits. Many growers of primocane-fruiting raspberries (main branch fruits first year) employ a temporary trellis during the fall harvest season. One temporary system that works well consists of T-shaped metal or wooden posts with three-foot crossarms with screw eyes at the ends. Baling twine attached to the crossarms is cheap, yet strong enough to hold canes erect temporarily. (See Figure 3).

A permanent trellis of the "V" type improves production of floricanes-fruiting raspberries (main branch fruits second year). Opposing posts are set into the ground at 20 to 30 degree angles. (See Figure 4.)

Fruiting canes are tied to the wires on the outside of the V in early spring, and new canes (primocanes) are permitted to grow on the inside of the V. Spraying, pruning and harvesting are made easier because floricanes are accessible and pri-

mocane interference is minimal. Yields often are increased because the amount of light reaching the foliage canopy is increased.

Vigorous plants, such as blackberry, are often tied to a trellis similar to that used for grapes, with one wire at three feet, the other at six.

Primocane Fruiting Raspberries

This type of raspberry plant produces fruit at the top of first-year canes in late summer and on the lower portion of the same canes in early summer of the second year. Most growers choose to sacrifice the early summer crop in favor of the superior quality of the late summer crop.

For the late season crop, cut primocane fruiting raspberry plants as close to the ground as possible each spring, so buds will break from below soil surface.

Floricanes Fruiting Raspberries and Blackberries

Floricanes fruiting types produce fruit on second-year canes. During the flowering and fruiting of the second-year canes, first-year canes are growing.

After fruiting, two-year old canes are cut to the ground. Early the next spring, one-year-old canes are topped at a desired height and thinned to a desired number, depending on type of berry.

Some growers prefer to simply mow half of a bramble planting each year during the dormant season. This is a low-labor system, but quality, size and total yield of the berries is reduced.

A third method is to remove all but four or five new canes per linear foot of row each year in June, when they are about eight inches tall. Red raspberries are best pruned in mid-March in colder climates. Remove winter-killed tips. Thin out canes to leave three or four per linear foot of row. Remove two-year-old canes at ground level after fruiting. (See Figure 5.)

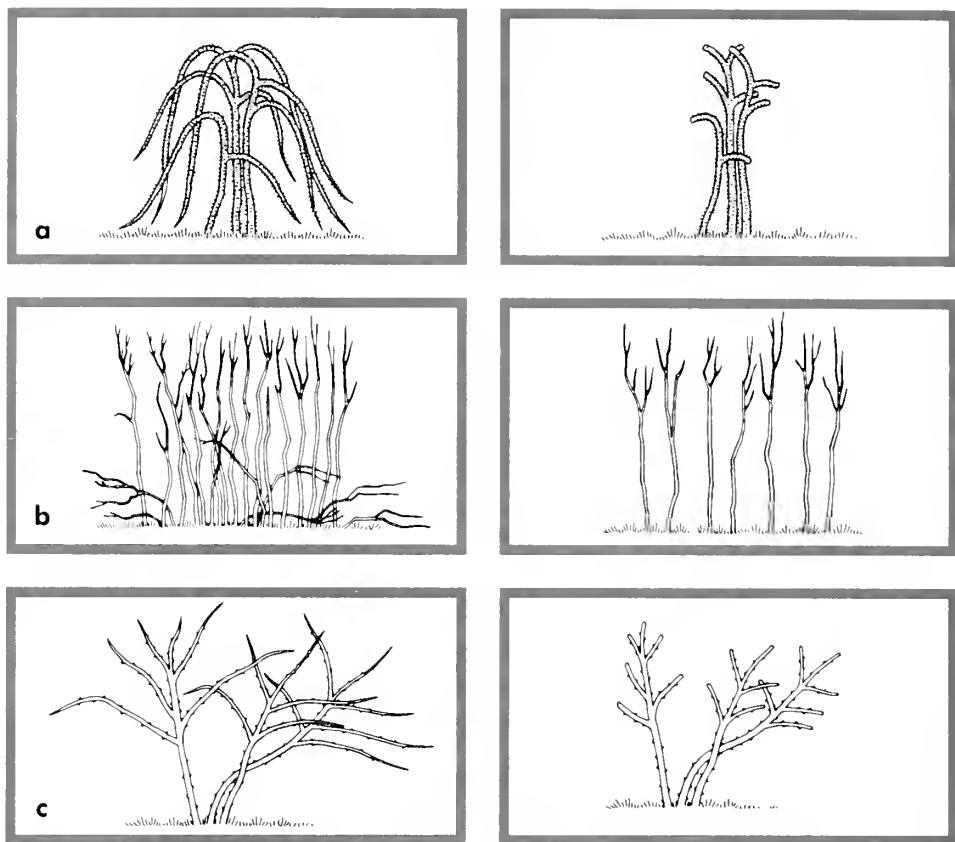


Fig.5.

RASPBERRY PLANTS, BEFORE AND AFTER PRUNING:

a) black; b) red; c) purple

Black raspberries should have new canes summer pruned (June in north temperate states) to about 24 inches. Thin out to two or three canes per foot of row. Remove two-year canes after fruiting. In March, remove winter-killed tips.

For purple raspberries, prune canes as high as trellis permits; remove tips that are winter-killed. Thin to three or four canes per linear foot of row. Remove fruiting canes in fall or early spring.

Thorny blackberries should be pruned in summer to three or four feet high. In early spring, remove old canes,

thin out one-year-old canes to two per linear foot and shorten lateral branches to 12 to 16 inches.

Thornless blackberries are best thinned in summer to six canes per foot. Remove fruiting canes after fruiting. In spring, shorten canes to the upper trellis wire, or wind them around the wire and shorten laterals to about 18 inches.

Pruning Blueberries

During the first year after planting blueberry bushes, remove all flowers as they appear to divert energy into vegetative growth.

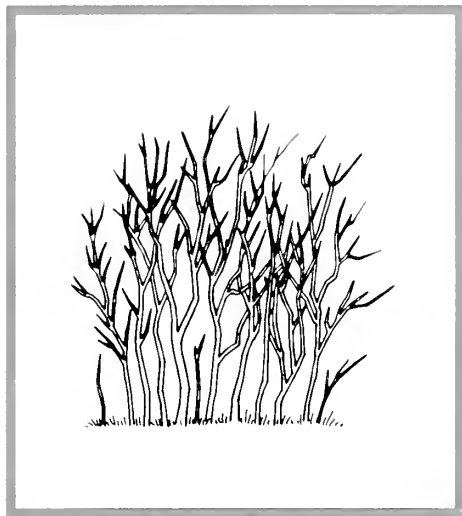
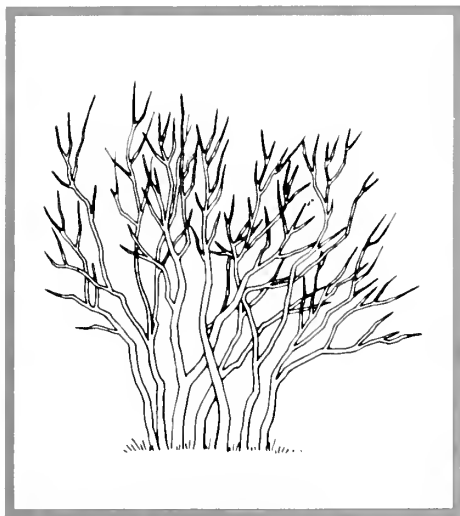


Fig.6.

BLUEBERRY PLANTS, BEFORE AND AFTER PRUNING:
left, unpruned; right, pruned yearly.

Each successive year, prune in early spring. Remove any winter-killed wood. Topping canes to stimulate lateral growth generally is not recommended.

The ideal blueberry bush should have no more than sixteen canes, ranging from small new ones to older canes no more than one inch in diameter. This can be achieved by allowing only two new canes to grow each year after planting until the bush is eight years old. Then the oldest canes should be one inch in diameter. Since canes one-half to one inch in diameter produce more fruit than larger canes, remove old canes at ground level when they exceed one inch in diameter.

As years go by, a blueberry bush pruned in this way behaves as an efficient young plant even though the root portion is old.

Pruning Currants and Gooseberries

Prune currants and gooseberries when plants are dormant, in late winter or early spring. Remove any branches that

lie along the ground as well as those that are broken, diseased and/or insect-infested (e.g. San Jose scale).

After the first year of growth, remove all but six to eight of the most vigorous stems. At the end of the second growing season, leave several one-year-old shoots and several two-year-old canes.

By the end of the third year, approximately four canes for each season should remain, twelve in all.

In the fourth year, remove the oldest canes and allow four or so sturdy one-year-old stems to develop. Continue to remove four-year-old stems each spring.

Pruning Elderberries

Elderberry bushes send up many new shoots each year. These branch and fruit during their second season. Fruiting is reduced on three-year-old stems, and is poor on four-year-old stems. Thus, each year in late winter or early spring, remove all four-year-old stems and any weak and spindly one-year shoots. 🍇

PRUNING DECIDUOUS & NEEDLED EVERGREEN SHRUBS

EDWIN D. CARPENTER

Pruning is an important element of the proper care of deciduous and needled evergreen shrubs — as essential as watering, fertilizing, mulching and pest control. Some yearly pruning is necessary for almost all deciduous and evergreen shrubs, for example, to control growth so the plants will not outgrow their allotted spaces. Yet pruning is often misunderstood and neglected.

Formal Versus Natural

For many years terms like “gum drops” and “lolly-pops” have been used to describe the shape of formally sheared shrubs. Some people like this formal style of pruning; some do not.

There are times, however, when sheared, formal designs are appropriate. Espaliers, topiaries and pollarded trees, for example, can add a touch of formal

elegance to landscapes.

For the most part, modern landscaping in the United States calls for informal, or natural-form, pruning. Plants should not be sheared into tight geometrical figures. They should be pruned according to their natural shapes; in most cases, it should not even be apparent that pruning was done.

Figure 1 illustrates the difference between formal and informal pruning. *Figure 3* illustrates informal pruning for spreading needled evergreens and for upright needled evergreens.

Pruning Methods

Two basic methods of pruning are shown in *Figure 4*. Thinning and heading back work together to keep plants in bounds. Thinning opens up the plant, and heading back controls height and spread.

Thinning out is a process of removing a branch at its point of origin at a branch union (a “Y”), or at a lateral bud, or at ground level. Old, tall stems are removed first, making room for new side branch-

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TYPES OF PRUNING

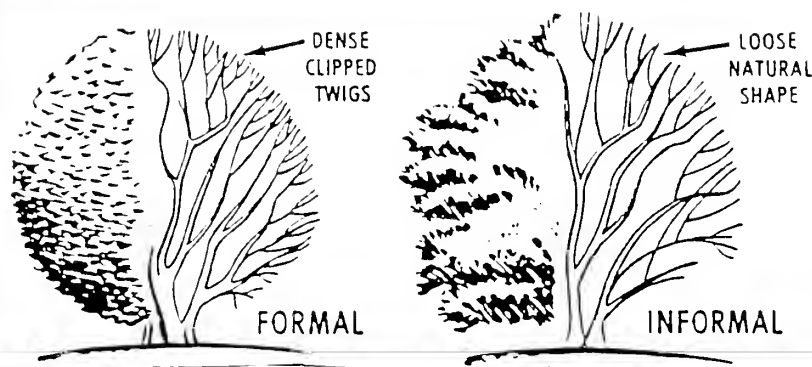


Figure 1: Formal (left) vs. informal (right) or natural pruning of deciduous and needled evergreen shrubs.

es. This kind of pruning results in a more open plant, without stimulating excessive new growth or changing the natural form of the plant.

There are two types of thinning: renewal and rejuvenation. Renewal pruning should be done on deciduous shrubs that are old and neglected. Shrubs are "renewed" by removing (cutting to the ground or nearly so) one-third of the old stems the first year, and removing the remaining two-thirds of old stems over the next two years.

Rejuvenation is more drastic: All the branches of an old shrub are removed at once by cutting to ground level or slightly above. This draconian procedure should be done only on shrubs known to respond well to it (some are listed in *Table 3*). The best time for rejuvenation pruning is late winter or early spring before new growth starts.

Heading back, the second basic method of pruning deciduous shrubs, is the removal of only terminal portions of branches (*Figure 4*). This procedure

reduces overall height and width of a plant. As a result, heading back stimulates new growth lower on the cut stems, making the plant more dense.

Too much heading back in a single season will generally cause more growth to occur than was pruned off. To be effective, heading back should remove only a small percentage of top growth in one season.

Pruning to enhance the natural growth habit of needled evergreen shrubs involves keeping them open for good light penetration and keeping them in bounds. The thinning method described above for deciduous shrubs is recommended for needled evergreens as well.

There are times when heading back is also needed (see *Figure 5*). Heading back cuts, like thinning cuts, should be made at a branch union or just above a bud.

Figure 5A illustrates pruning cuts needed to maintain a natural, compact, upright growth form.

Figure 5B illustrates pruning back to a bud or branch union to control the spread of a plant.

NATURAL FORMS OF SHRUBS



V-shaped



Horizontal weeping



Upright — leggy



Horizontal oval



Low spreading



Vertical oval



Round



Upright

Figure 2: A few of the natural forms of shrubs. Before pruning study the plant and its form. Decide what you wish to accomplish before pruning.



Dwarf pine showing candles of new growth.

Figure 5C shows the removal of an overly long central leader.

Figure 5D illustrates the removal of multiple leaders. One leader is preferred for a stronger plant. Remove the weakest, leaving the best one to become the central leader.

All needled evergreens can be pruned as noted above, except pines. Pines put out a single flush of growth per year and

stop. To avoid dead stubs and poor appearance, pines must be pruned in the "candle stage" of growth (see *Figure 6*).

To promote dense growth, prune the candles when they are two to three inches long, when the new stem is still soft. This new growth can be shortened by as much as three-fourths of its length with pruning shears or a sharp knife. Often it

NEEDED EVERGREEN SHRUBS

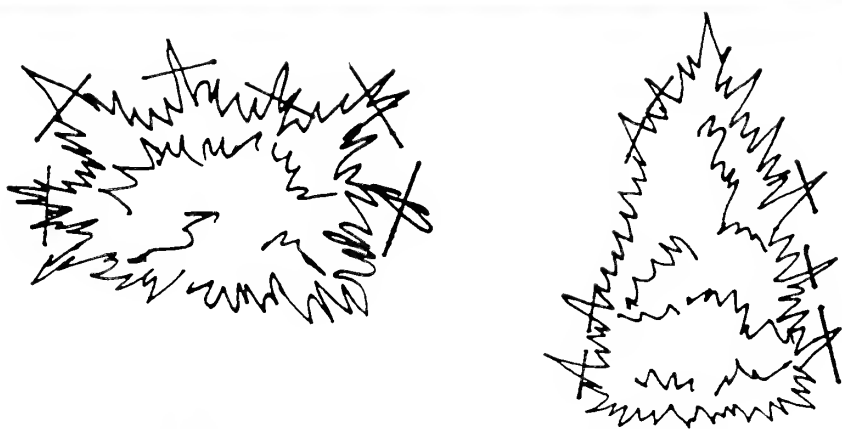
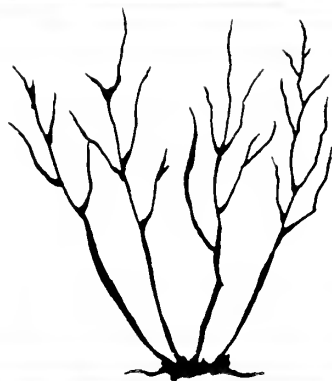
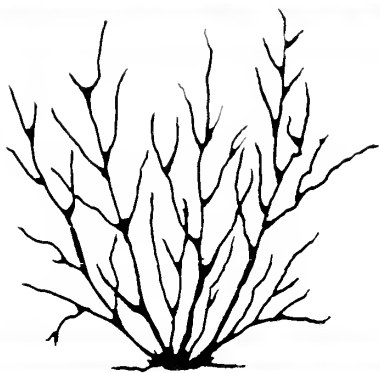


Figure 3: Two natural forms of needled evergreen shrubs. Spreading types are represented by junipers and yews, arborvitae and falsecypress.

THINNING



HEADING

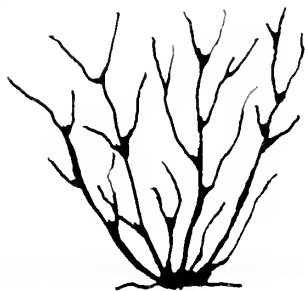
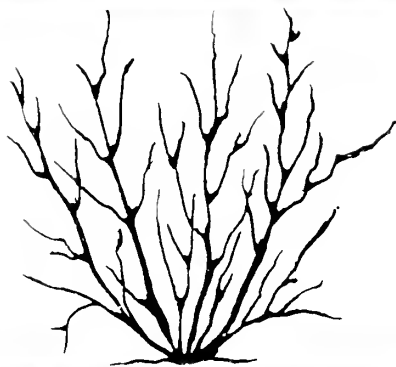


Figure 4: Thinning involves removing entire branches back to where they began. Heading, shortens branches, rather than removing them entirely.

can be snapped off readily with one's fingers. Do not remove last year's growth.

When to Prune

According to the old adage, pruning can be done anytime the knife is sharp. This simply means that broken, damaged, insect-ridden and/or disease-infested stems can be removed whenever you see them. Other light pruning can be done anytime with little effect on the plant.

But moderate to heavy pruning can be

a problem if done at the wrong time. Since landscape plants are often grown for flowers and/or fruits, it is important to know when plants produce flower buds. Tables 1 and 2 illustrate how to prune according to when flower buds are formed.

With the exception of pines, needled evergreen shrubs can be pruned most anytime, except late summer. Needled and deciduous shrubs shouldn't be pruned at this time (August through mid-September in northern climates) because it may encourage



Figure 5A: Pruning an upright or spreading needled evergreen for compact growth.



Figure 5C: Pruning to shorten a leader that has grown too long.



Figure 5B: Pruning a needled evergreen to control growth in spread.

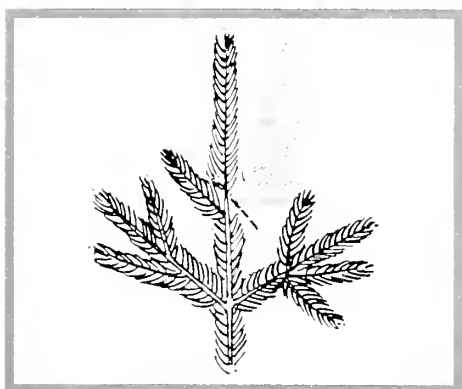


Figure 5D: Pruning to remove all but one leader when multiple leaders form. Leave the best of the leaders that grow.

TABLE 1

Spring flowering shrubs should be pruned immediately after flowering. Flower buds develop during the previous summer's growth. If pruned before flowering in the spring, flower buds will be removed and no flowers or fruits will be available during the current season.

SCIENTIFIC NAME

COMMON NAME

<i>Amelanchier</i> species	Shadblow
<i>Berberis</i> species	Barberry
<i>Calycanthus</i> species	Sweetshrub
<i>Cercis</i> species	Redbud
<i>Chaenomeles</i> species	Flowering quince
<i>Cornus florida</i>	Flowering dogwood
<i>Cornus kousa</i>	Kousa dogwood
<i>Cornus mas</i>	Cornelian cherry
<i>Deutzia</i> species	Deutzia
<i>Forsythia</i> species	Forsythia
<i>Kolkwitzia amabilis</i>	Beautybush
<i>Ligustrum</i> species	Privet
<i>Lonicera</i> species	Honeysuckle
<i>Magnolia</i> species	Magnolia
<i>Malus</i> species	Crabapple
<i>Philadelphus</i> species	Mock orange
<i>Prunus</i> species	Flowering cherry and plum
<i>Rhododendron</i> species	Rhododendron and azaleas
<i>Rhodotypos scandens</i>	Black jetbead
<i>Rosa</i> species	Climbers and shrub roses
<i>Spiraea thunbergii</i>	Thunberg spirea
<i>Spiraea x vanhouttei</i>	Vanhoute spirea
<i>Styrax japonica</i>	Japanese snowball
<i>Syringa</i> species	Common, Chinese and French lilacs
<i>Viburnum x burkwoodii</i>	Burkwood viburnum
<i>Viburnum carlesii</i>	Korean spice viburnum
<i>Viburnum lantana</i>	Wayfaring tree
<i>Viburnum opulus</i>	European cranberrybush
<i>Viburnum plicatum tomentosum</i>	Doublefile viburnum

new growth which won't have time to harden off and may be killed by frost. The time to prune pines is when candles of new growth are two to three inches long. In Connecticut, this normally occurs during the first two weeks of June.

Finally, a word of caution. The pruning recommendations here are offered as guidelines. For species not mentioned, and for local conditions that influence pruning techniques and timing, consult local authorities or one of the number of reference books that are available. 🌲

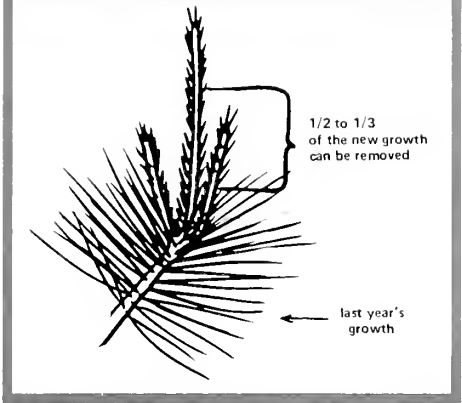


Figure 6: Prune pine when candles are two to three inches long.

**TABLE
2**

Summer flowering shrubs should be pruned before spring vegetative growth begins. These plants develop flower buds after stem growth has started. Pruning from late November to early spring before buds break is recommended.

SCIENTIFIC NAME	COMMON NAME
<i>Acanthopanax</i> species	Aralia
<i>Buddleia</i> species	Butterflybush
<i>Callicarpa</i> species	Beautybush
<i>Clematis</i> species	Clematis
<i>Hibiscus syriacus</i>	Shrub althea
<i>Hydrangea paniculata</i> 'Grandiflora'	P.G. hydrangea
<i>Hydrangea quercifolia</i>	Oakleaf hydrangea
<i>Rosa</i> species	Hybrid tea rose

**TABLE
3**

A short list of plants which can be rejuvenated by cutting back to the ground. They generally will return to usefulness in short periods of time. Spring flowering plants may not flower for two or three years when rejuvenated in early spring.

SCIENTIFIC NAME	COMMON NAME
<i>Buddleia davidii</i>	Orange-eye butterflybush
<i>Clematis x jackmanii</i>	Jackman clematis
<i>Forsythia</i> species	Forsythia
<i>Hibiscus syriacus</i>	Shrub althea
<i>Hydrangea arborescens</i> 'Grandiflora'	Hills-of-snow
<i>Hydrangea quercifolia</i>	Oakleaf hydrangea
<i>Lonicera</i> species	Honeysuckle
<i>Polygonum aubertii</i>	Silver fleece vine
<i>Spiraea</i> species	Spirea
<i>Syringa</i> species	Lilac

PRUNING BROADLEAF EVERGREENS

FRED C. GALLE

The basic principles for pruning broadleaf evergreens are the same as for deciduous shrubs (see page 36). As a rule, to avoid a prolonged sheared look, prune in early spring just before new growth starts. Except for hedges and for special effects, prune to the natural shape and growth habit of the plant. Most of the broadleaf evergreens can receive corrective pruning and light pinching to increase branching at any season of the year.

Old, leggy, multiple-stemmed plants, such as privets, hollies and camellias, can be sculpture-pruned into beautifully formed, large shrubs or small trees by removing lower branches. Thinning out the crown and removal of suckers or feather growth will also increase the attractiveness of old plants (see Pruning for Character and Size Control, page 56).

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If complete rejuvenation is required, it should be done in late winter or early spring by cutting the plants to six to eighteen inches from the ground. The strong vegetative growth that subsequently develops in the spring will require thinning and pinching to form compact plants.

An alternative to complete rejuvenation, called "coat rack" pruning, may be used with spindly open specimens of American holly (*Ilex opaca*), English holly (*I. aquifolium*), horned (Chinese) holly (*I. cornuta*) and others. Branches are severely cut back, but the general form of the plant is retained. Such a plant will look stiff (like a coat rack), but new growth will quickly fill in to form a thickly branched plant.

Holly and Osmanthus

Hollies, depending upon species and cultivars, vary from densely conical or rounded to open and multiple-branched. Observe the natural shape and prune to enhance the habit of growth. Pruning of fruiting branches at Christmastime provides material for holiday decorations. Keep in mind, however, that some hollies produce fruit on old wood; you will be removing flower buds that were produced in late summer. Hollies in this

group include lusterleaf holly (*Ilex latifolia*), horned holly (*I. cornuta*) and its many cultivars such as 'Burfordii'. Heavy pruning of these in winter will reduce the abundance of fruit the next season.

In contrast, most hollies produce fruits on the current season's growth. In this group are several hollies indigenous to the United States and their cultivars: American holly (*I. opaca*), Topal holly (*I. x attenuata*), cassine (dahoon) holly (*I. cassine*) and myrtleleaf holly (*I. myrtifolia*). Yaupon holly (*I. vomitoria*) is the only U.S. indigenous holly that produces flowers and fruits on old wood.

Some introduced holly species also bear fruits on new growth: long-stalk holly (*I. pedunculosa*) and Chinese holly (*I. purpurea* [chinensis]).

Moderate pruning of fruited branches of the above "new growth fruiterers" will not affect fruit production for the next season.

Japanese holly (*I. crenata*) and inkberry (*I. glabra*), both of which have relatively inconspicuous black fruits, should be pruned in early spring before new growth starts and touched up once or twice during the growing season as needed, especially if used as hedges.

Osmanthus species of foreign origin, such as *O. fragrans*, *O. heterophyllus*, *O. x fortunei*, *O. armatus* and *O. delavayi*, are prized for their attractive foliage and their fragrant creamy-white flowers in late fall and winter. Cutting of small flowering branches allows one to enjoy the delightful fragrance indoors. Heavy pruning, if needed, should be delayed until early spring.

Osmanthus americanus (devilweed), a native to the United States, flowers in the spring on old wood and bears fruit in the fall. Thus, early-spring pruning reduces flowering and fruiting, but pruning after flowering reduces fruiting. Take your pick!

Camellia and Pyracantha

Prune camellias in late winter and early spring after flowering. Summer pruning

of leggy growth is often required to keep plants compact. Old leggy plants can be sculpture-pruned to a treelike form or rejuvenated completely by cutting off all branches 6 to 12 inches from the ground. This is a drastic treatment and not all may respond to this heavy pruning. For these special old-timers it is best to extend the rejuvenation over a three-year period by removing a third of the branches each year.

The new vigorous growth from cut-back plants will require thinning out some of the excessive growth and also pinching of the new shoots to develop lateral growth.

Disbudding of flower buds from some *Camellia japonica* cultivars is often required to produce better flowers. Some cultivars develop a considerable number of large, rounded flower buds that should be thinned out to produce perfect specimen blossoms. Care should be taken in removing the large flower buds to avoid disturbance of the long, slender leaf buds. *Camellia sasanqua* and *C. reticulata* plants seldom need to be disbudded. Old blossoms and swollen fungus-diseased leaves should be removed and destroyed.

The blossoms and fruit of pyracantha (firethorn) are produced on short spur-like branches from two-year-old wood. Thus, heavy pruning in any one year will reduce the colorful berry crop that fall. Spring and summer pruning of new growth will aid in keeping vigorous plants in bounds. For confined areas, use the less vigorous dwarf varieties. Diseased brown leaves and branches resulting from fire blight should be removed by cutting back into fresh, disease-free stems.

Ericaceous Plants

Mountain-laurel (*Kalmia latifolia*) and pieris (*Pieris japonica* and *P. floribunda*) produce flower buds on old wood and should be pruned after flowering. Old, overgrown specimens of these species can be renovated by severe pruning in



A big American holly before severe pruning (hatracking).



The same plant after "hatracking."



The same plant two years after "hatracking."

late winter or early spring. Both heath and heather (*Erica* and *Calluna*) are best pruned by removing flowers as they fade. Ragged or out-of-bounds old plants can be cut back in spring or summer.

Rhododendrons that appear thin and leggy can be thickened by pruning off the terminal rosette of leaves to just above a lower rosette of leaves, not leaving a long stub. New vegetative shoots will develop from the dormant buds in the axil of each leaf of the rosette.

Disbudding, the removal of leafy growth buds with thumb and forefinger, is an easy way to develop compactness on young plants, but time-consuming on large ones. Once the terminal leaf bud is removed, dormant sidebuds will develop at the end of the branch. Flower buds are larger and more rotund than the tapered, slender leaf buds.

Deheading of rhododendrons is the removal of old flower trusses before they develop seed capsules. Failure to do this


often results in the rhododendron producing a good display of flowers only in alternate years. This does not apply to azaleas or small-leaved rhododendrons.

Others

Boxwoods are most attractive with their dense, billowy habit. Light pruning and pinching of new growth will increase branching.

The beautiful evergreen daphnes generally require little pruning except cut-

ting of the largest stems of fragrant early spring flowers to use in the home.

Mahonias and nandinas often get leggy and bare at the bottom as they mature. An annual removal of a third of the old canes at ground level in early spring will allow new leafy shoots to develop, forming fine specimens after three years. When not many canes are present, a complete rejuvenation can be obtained by cutting off all the leggy canes at one time. 

PRUNING DISEASED PLANTS



hen pruning trees and shrubs that have wilt, canker, fireblight, gall or other diseases that affect some but not all

parts of a plant, care must be taken to avoid spreading the disease to healthy tissue.

Don't prune when plants — diseased or robust — are wet. Water is an effective vehicle for nasty little organisms.

Always cut well below diseased areas, as much as six inches, into healthy tissue.

At this point, some pruning texts add: and sterilize pruning tools after every cut. Alcohol, the isopropyl kind, has been recommended for sterilizing

tools between cuts, or at least between plants. Household bleach is sometimes mentioned, but it may be corrosive to some metal surfaces.

Some authorities claim that such quick dip (on pruning saws, more likely quick wipe) treatments are ineffective. Indeed, few surgeons rely on such a "sterilization" of scalpels between patients.

One pruning authority, when questioned recently about sterilizing pruning tools, replied, "Nobody is doing it."

Well, at least pay attention to the second and third paragraphs above.

And burn, discard or bury the diseased prunings in accordance with local laws and regulations.

PRUNING CONIFEROUS EVERGREEN TREES

FREEK VRUGTMAN

A tree looks best when it attains its natural size and shape. Prune coniferous trees only for a definite reason, never just for the sake of pruning. Before you prune try to visualize what will happen if you do prune.

Broken Leaders

Should a leader be broken, a lateral branch can be trained to become a new leader. The best time to do this is spring when the branches are more flexible and can be bent carefully without breaking. A

brace or splint (Fig. 1) is used to hold the new leader in place throughout the following growing season, after which the brace should be removed. Strips of a nylon stocking or fabric used in figure-eight fashion make good ties and are to be preferred to twine or wire, which may injure the young bark.

Two Types of Coniferous Trees

Firs, Douglas-firs, pines, spruces and a few less common conifers produce their branches in whorls around the main axis. Given good soil, enough space, light and water, these trees will normally grow into symmetrical conical specimens requiring



Figure 1

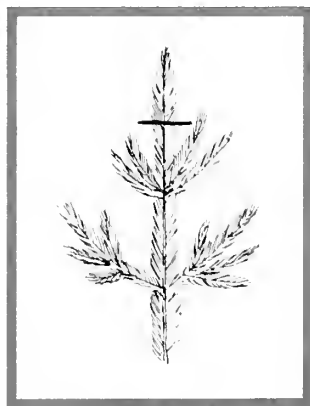


Figure 2



Figure 3



Figure 4

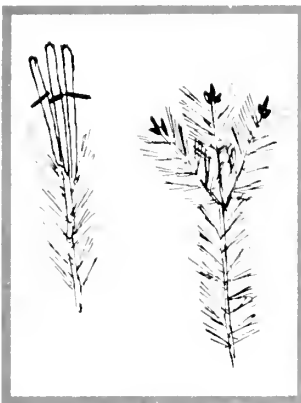


Figure 5



Figure 6

little pruning. It may happen that a tree is very vigorous and the annual growth of the leader is long, so long, in fact, that the whorls of lateral shoots are quite far apart, with conspicuous bare spaces between the upper whorls. These open spaces can be reduced by pruning the growing leader to about half its size in the spring during the active growing season (Fig. 2). Do not cut before the new growth is well underway, and do not prune after the new growth is nearly mature, because no new terminal bud can be formed from hardened tissue.

Lateral growth can be checked in a similar way, or you can remove the terminal bud of a side branch (Fig. 3). If even greater size control is needed, cut the branches back to an inner bud (Fig. 4). More drastic pruning than this is ill advised, as these plants are incapable of regenerating from older wood. Pines may be pruned in the "candle stage" when new young shoots, with their immature needles packed tightly around the stem, look like candles (Fig. 5). When nipped in half at this stage, the annual growth is reduced and buds will be formed at the end of the pruned shoot. Sometimes secondary or even tertiary leaders develop; these should be removed as soon as possible and not left to develop for another

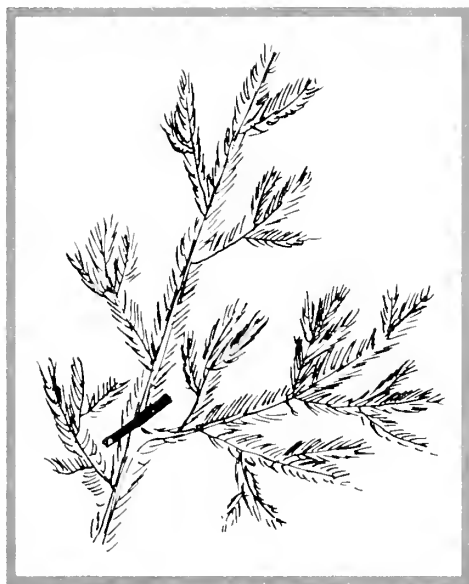


Figure 7

growing season (Fig. 6).

Arbovitae, cedars, cypresses, false-cypresses, giant sequoia, hemlocks, junipers, redwood and yews are characterized by a less regular pattern with buds and branches not arranged in whorls. Slowing down the growth by pruning can be done more easily than in conifers with a whorled growth pattern. Lateral branches that are too long can be

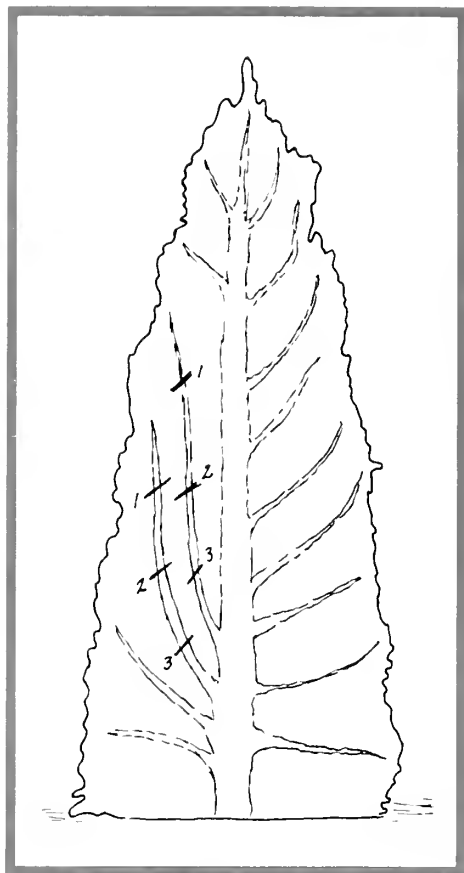


Figure 8



Figure 9

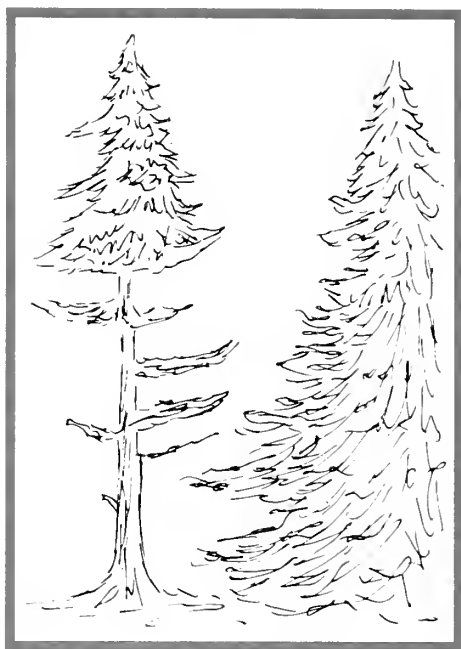


Figure 10

pruned back to within the periphery of the foliage where the cutting point will be hidden, provided the branches still carry sufficient foliage to continue to grow (Fig. 7). Only giant sequoia and yews should be pruned back more severely, even right back to the trunk if necessary; latent buds will break and give rise to a new crown in a few years.

Single trunks also are to be preferred for coniferous trees in this group, but occasionally lateral branches develop into secondary leaders and remain undetected for years. This happens most frequently in arbovitae, false-cypresses and junipers. Visually this is no disaster since the plant as a whole retains its characteristic shape; structurally, however, such a plant is at a disadvantage, particularly in regions where snow storms and ice storms are frequent and where multi-stemmed conifers are the first ones to suffer damage. Secondary leaders may be

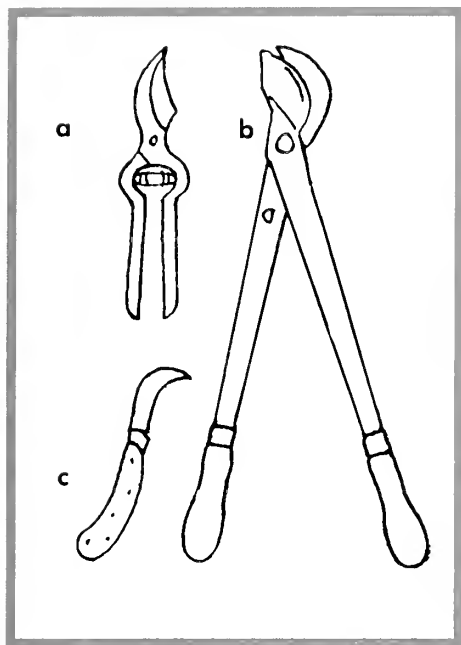


Figure 11

- a) Pruning shears;
- b) Lopping shears;
- c) Pruning knife

pruned back gradually over a period of several years until only a side branch remains and the gap has been filled in gradually by lateral growth of the surrounding branches (Fig. 8)

Pruning to Correct Problems

Sometimes a Colorado blue spruce or other evergreen trees will grow in an extremely lopsided manner, even without being crowded by other plants or without exposure to prevailing winds (Fig. 9). Chances are, the plant is a grafted one and the scion used in grafting came from a lateral shoot. Such a plant needs to be staked until it gains the desired posture. If one side of the plant produces more vigorous growth than the opposite side, it will require some careful pruning (removal of

buds, pruning during spring growth or pruning to an inner bud as discussed earlier) to obtain a symmetrical tree.

You may be tempted to remove the lower branches of large evergreens if they interfere with mowing the lawn, but keep in mind that, once removed, there will be a gap that cannot be filled again by your tree (Fig. 10). Make sure the plant continues to receive full exposure to light. Do not wait until the lower branches begin to turn brown; once the needles have turned brown there is no chance for recovery. Do not expect three trees to grow to maturity gracefully where there is only space for one.

Tools and Techniques

For all pruning work, use the proper tools such as hand pruning shears (secateurs), lopping shears, a pruning saw and a pruning knife (Fig. 11). Be sure the tools are sharp and free of rust; they will be easier to work with and do a better job. Always make clean, smooth cuts without ragged edges. If you use a saw, smooth the surface of the cut with the pruning knife. Do not leave any stubs; they will die back. Do not damage buds, cut just beyond (above or outside) a bud (Fig. 12). If you detect or suspect disease, clean tools after each cut.

If, after the pruning is done, you stand back and can hardly detect where the tree was pruned, you are looking at a job well done. 🌲

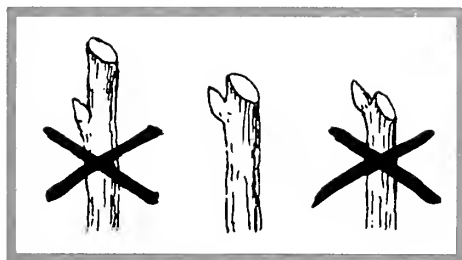


Figure 12

PRUNING AT TRANSPLANTING

ELTON M. SMITH

The objective of transplanting is to establish the plant in its new site as quickly as possible. Proper pruning at this time helps a woody plant survive the disruption and injuries caused by its removal from the nursery or site where it was grown. The original source of the plant may have a significant bearing on the need for pruning landscape plants at the time of transplanting.

Nursery Grown vs. Collected Stock

Most landscape plants are produced in commercial nurseries where regular pruning is part of the cultural program. Thus it's unusual to need more than minimal pruning at transplanting time.

Plants grown in a nursery are often transplanted and/or root-pruned during various stages of production, which also helps promote a compact root system. Nursery-raised plants have a much higher success rate than those collected from the wild.

Some landscape plants offered for sale, however, are collected from native stands and will need more pruning for successful transplanting. The shape of collected plants is usually not up to the standard of nursery-grown plants. Pruning will be important to shape the plant (especially if

it is a tree), to remove dead or pest-infested portions, if any, and (most important) to reduce top growth to compensate for a significant loss of root growth.

Some states have plant labeling laws requiring labels which indicate if plants offered for sale have been collected from the wild. If the quality of plants in a sales lot is questionable, be certain to inquire.

Sometimes plants may be moved from one site in the landscape to another, and the amount of pruning necessary will vary depending upon size, shape, species, health and other factors.

Woody Plants from the Garden Center

Nursery-grown stock in the garden center is available in several forms. Some forms will need more extensive pruning than others.

Balled and Burlapped

Trees larger than two inches in diameter are sold balled and burlapped (B&B), as are most field-grown evergreens and larger field-grown shrubs. Limited — if any — pruning is required and no root pruning is possible.

In some sections of the U.S., some trees and other plants are produced in fabric containers inserted at planting into the ground. These plants require a minimum of pruning of either the top growth or root system when transplanted.

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Bare Root

Many deciduous plants are sold in early spring in bare root form. These plants are usually lower in price, require some root and top pruning and have a lower transplant survival rate. Deciduous shrubs, as well as trees less than two inches in diameter, are often sold bare root.

Container-Grown

Very little if any pruning is necessary with above-ground portions of container-grown plants. However, survival may be enhanced if the lower half of the root system is cut vertically and spread out horizontally when planted.

Roots of container-grown plants grow much deeper than similar plants in the field because container media have excellent drainage and aeration, and roots usually grow to the bottom of the container. Planting these bottom roots at the base of a planting hole in heavy soil may result in planting too deep, and a lack of air at this depth will lead to the death of those roots.

To increase chances of survival, according to research in Maryland, cut the root system vertically with a spade from the base to approximately half way towards the main stem. Then spread the cut portions horizontally in the planting hole to position them nearer the surface, where soil conditions are more favorable for root growth. Splitting the root system stops the circular habit of growth that the roots developed from growing in the containers and forces roots to develop new lateral roots into the backfill.

Splitting the rootball of container-grown shrubs is especially important if roots have become pot-bound in the container, and/or if the soil at the planting site is clayey and poorly drained.

Field-Potted

An increasing number of plants, especial-

ly narrowleaf evergreens such as yews and junipers, are field-potted. They are grown in a nursery field to salable size, then dug and potted prior to sale.

These should not be treated as container-grown plants. Typically, they can be identified in the retail lot because they are in a fiber-composition pot rather than a plastic container. Most growers dig these in autumn and overwinter them prior to delivery for spring sale. New root activity often occurs during this period, increasing the chances of survival after transplanting. Transplant survival rates are usually quite high for these plants, although not as high as for container-grown plants. Vertical cutting of the root system is not recommended for field-potted plants.

Packaged

Packaged plants are commonly available in garden outlets during the spring season. These are plants which have been dug bare root and the roots packed in an organic medium such as peat moss or a bark mix and wrapped in plastic. Only a minimum of pruning is required at transplanting because most of these plants have been graded and pruned prior to processing.

Pruning by Plant Group

The amount of pruning required at transplanting also varies according to plant group.

Deciduous Trees

The first pruning after trees are obtained consists of removing broken, crowded, crossing and pest-infested branches. Branches that were cracked at the base or otherwise injured when bundled and packed should be removed or shortened.

As a rule, the central leader of a tree should not be pruned. A couple of exceptions to this rule are naturally low-branched trees or when multiple-stemmed plants are desired. Trees with a

central leader, such as linden, sweet gum or pin oak, may need little or no pruning except to eliminate branches competing with the central leader; these should be removed or shortened. Some pruning may be necessary to maintain desired shape — shortening extra-vigorous shoots, for example.

The height of the lowest branch can be from a few inches from the ground for screening or windbreaks, to seven to twelve feet or more above the ground for shade trees and for trees near streets, decks, patios, etc. "Limbing-up" (removal of lower branches) is usually conducted over a period of years after transplanting until the desired height of lowest branches is reached.

For greatest strength, branches selected as permanent "scaffold" branches must have wide angles of attachment with the trunk. Branch angles less than 30 degrees from the main trunk are prone to breakage, while those between 60 degrees and 90 degrees have a very small breakage rate, according to research in California.

Vertical branch spacing and radial branch distribution are important. If this has been neglected in the nursery it can at least be begun at transplanting.

Major scaffold branches of shade trees should be spaced at least twelve inches and preferably twenty to twenty-four inches apart. Closely spaced branches become long and thin, with few lateral branches and poor structural strength.

Radial branch distribution should allow five to seven scaffold branches to fill the circle of space around a trunk. Radial spacing prevents one limb from overshadowing another, which in turn reduces competition for light and nutrients. Remove or prune shoots that are too low, too close or too vigorous in relation to the leader and branches selected to become the scaffold branches.

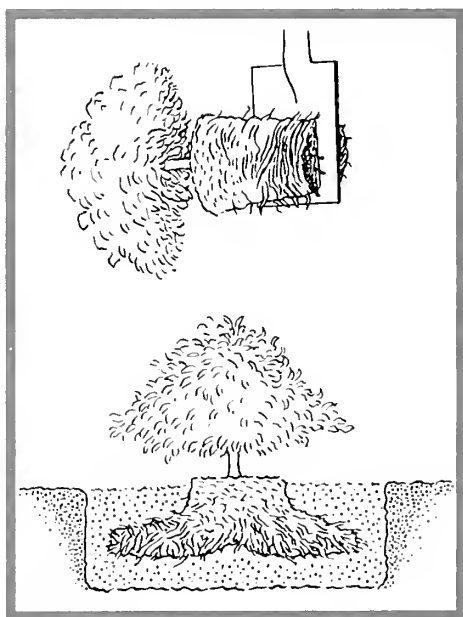
The rule of pruning away one-third of the top growth at transplanting to compensate for root loss should not be necessary for properly pruned nursery-grown plants.

Too much pruning at transplanting, according to research in Oklahoma, reduces plant size and does not improve chances of survival.

However, if little pruning was done at the nursery or the plants were collected, considerable pruning may be necessary to achieve a central leader, the desired shape and proper branch spacing and radial distribution.

Trees that should be pruned and are not pruned at transplanting time will prune themselves by dying back in time. Corrective pruning at transplanting will reduce or eliminate branch and twig dieback, assum-

ILLUSTRATION BY EVA MELADY



When planting container-grown plants in heavy soils, split the lower half of the root system and spread the roots horizontally. This practice will prune the roots, thus encouraging new laterals, prevent girdling roots and raise the lower roots closer to the soil surface.



Left: fabric container. Right: bare root. Plants harvested bare root will require more pruning.



Trees can be successfully produced in containers and survival is usually high with a minimum of pruning.

ing other conditions are optimal.

When transplanting a bare root tree, the only root pruning that should be needed is removal of broken or damaged roots. Do not cut roots to fit them into a planting hole that is too small, but rather increase the diameter of the hole to accommodate the roots without bending or crowding them.

Deciduous Shrubs

When shrubs are transplanted bare root, some pruning may be necessary. Light pruning of roots may be needed if any are broken, damaged or dead. Branches should be pruned by the thinning method — not shearing — to reduce the overall plant size by one-half or more. Research at Ohio State University indicates that survival and regrowth of deciduous shrubs was increased with removal of one-half or more of the branches of bare root plants at planting time.

Shrubs transplanted with a ball of soil or from a container require little, if any, pruning. Occasionally, branches are damaged in transit and these should be removed. Prune only to maintain desired size and shape.

Container-grown shrubs with pot-bound roots, and/or those which will be planted in heavy soil, benefit from splitting of the root mass as described above

in the section "Container-Grown."

Evergreens

Most evergreens are sold B&B or in a container and, as with deciduous shrubs, little pruning of branches is necessary.

The root-splitting technique, described above under "Container-Grown," is usually beneficial to evergreens at transplanting time, especially if roots are pot bound and/or the soil is heavy.

Root Pruning Research

Research conducted in Minnesota indicates that the following metal compounds have been found to be effective root pruning agents: cobalt chloride, cupric sulfate, nickel chloride, silver nitrate, sodium borate and zinc sulfate. Silver nitrate was the most effective in promoting root branching of woody plant seedlings in a field trial.

Work in Canada and in Ohio has shown that cupric carbonate has been an effective promoter of root regeneration following transplanting. These findings were determined by treating the inside of plastic containers with cupric carbonate.

None of these metal compounds, however, are registered by the Federal Environmental Protection Agency for use in controlling root growth at this time. 🌱

PRUNING FOR CHARACTER & SIZE CONTROL

GEORGE S. AVERY

On one of our early trips to Japan we visited a rural elementary school on Shodo Island (Shodoshima), in the Inland Sea. It was a memorable visit in more ways than one. Our guide and host was the late Kanichiro Yashiroda, long a Brooklyn Botanic Garden correspondent and personal friend. (Mr. Yashiroda was Guest Editor of several special-subject handbooks, and was twice appointed a Teaching Fellow for courses on bonsai at the Botanic Garden.)

Along with all the warmth and friendliness, there is another outstanding item of memory...a great multiple-trunked tree on the school grounds, a truly venerable specimen. Its character? Three great trunks that leaned out over the school playground. Its age? Probably 250 to 300 years. In richness of appearance and inspiration, it offered something of the spirit of bonsai, though a giant in structure.

I wondered then, and I wonder now,

how it is that we of the Western world have missed seeing and appreciating the grace of wind-blown trees, or the special qualities of asymmetrical balance, or the charm of multiple-trunked trees. "Specimen" trees with their single formal upright trunks have long been the objective of landscapers and others primarily concerned with street and park plantings. But why have the rest of us failed to venture into the less formal patterns that nature offers us for our own home grounds? Individual tastes will differ, but included here are a few examples that suggest an approach to what can be done...by those who wish to test their skill.

As for the qualities in woody plants that favor success in pruning and shaping for character, it is of greatest importance to select species or varieties with fine-textured foliage; large leaves simply are not compatible with attaining quality of skeletal form. If broadleaf deciduous specimens are desired, it is imperative to select varieties whose leaves are naturally small and with short leaf-stalks (petioles). In general, choose species that have only one leaf at a node.

GEORGE S. AVERY was Director of the Brooklyn Botanic Garden from 1944 to 1969.

Examples are small-leaved azaleas and Japanese hornbeam. Or, if evergreens are your choice, choose short-needled Japanese white pine, yew or spruce. Among broad-leaf evergreens, several kinds of Japanese holly are ideal candidates.

If starting with younger plants that you might select at a nursery, the trunk can be shaped by pruning. Simply remove the straight upright-growing leader and leave a side branch at the desired height. As the latter grows from year to year, save the branch or branches growing in the direction desired and clip off the others. This is the secret of developing the desired asymmetrical structure, thus determining the form of the tree-to-be.

Foliage masses (clumps of dense foliage) can, in turn, be developed by cutting out some of the branches, leaving open spaces here and there to show portions of the main trunk or more important side branches. At the same time, shorten all lateral branches wherever dense clumps of foliage are desired, cutting each branchlet back to a bud. Later, after the plant is older, one needs only to

shear the periphery of the foliage masses to maintain them. Paul Takuma Tono, another Japanese Visiting Fellow at the Botanic Garden some years ago, referred to the foliage masses as simulating "clouds floating in the sky."

Pruning and thinning older specimens of low-growing (dwarf) varieties can often bring surprisingly interesting results in just a few years. But a word of warning: For ease of maintenance of varieties that if left unaltered would grow on into large trees, keep them at a workable height. Six to eight feet should be the maximum. I keep a Swiss stone pine (*Pinus cembra*) at six feet and a Japanese white pine (*P. parviflora*) at eight feet. The latter requires a step ladder for its once-a-year grooming. Both trees are something over forty years old...and give me considerable pleasure.

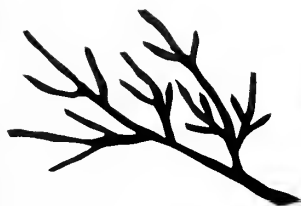
In summary, if one seeks to develop trees of unusual character for special locations or situations, it takes a bit more than orthodox know-how of sanitary pruning and thinning. Highly selective pruning is the answer.



Selective pruning restores open form.

UNSHEARING SHRUBS

CASS TURNBULL



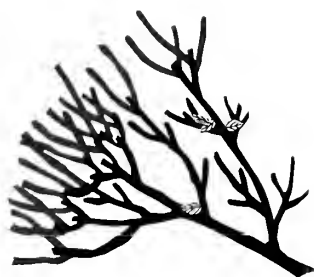
First shearing:

Before shearing, branching is open and natural.



Second shearing:

First shearing has provoked growth of many new shoots



Third shearing:

Repeated shearing has produced twiggy canopy. Dense canopy shades interior; leaves and branches die.

Andrea opened my eyes. Years ago when I worked for a city park department, my crew took pride in keeping junipers, dogwoods, spirea and azaleas neatly sheared, and the public complimented us.

Then the department hired Andrea, a horticulturist, to teach us about plants. Observing our careful shearing, she said, "It's a crime against nature."

I was surprised and confused at first, but eventually I understood that selective pruning is better than shearing for most shrubs. It respects their natural form and is less threatening to their health. As a bonus, it is easier on the gardener.

I have to admit that shearing has its place when formality and contrast are important, as in hedges and topiary, and in knot, rose and Japanese gardens.

But I don't believe that sheared shrubbery makes a conventional yard look tidy and interesting. To me, it's an eyesore. Sometimes I resort to mockery and call sheared shrubs "poodleballs," "hockey pucks" and "green meatballs."

In my landscaping business, I help gardeners unshear their shrubs. When a client calls, I often find a close-cropped bun of leaves. In a few years, I transform it into an open framework of branches with a graceful, natural-looking canopy. The process takes judicious pruning in small doses. I'll show you how I do it, but first I'll talk about the drawbacks of shearing.

What's Wrong with Shearing?

For one thing, few shrubs are well suited to shearing. The ideal candidate is tough enough to take repeated shearing, and regrows from old branches if you must prune away its leafy shell. The best plants for shearing also have small evergreen leaves, so they look neat and attractive all year.

Among conifers, only fine-neededled yews, junipers, hemlocks and arborvitae

CASS TURNBULL left Seattle Parks Department in 1986 after 11 years. She operates a landscape business, and is founder of PlantAmnesty, a rapidly growing nonprofit organization dedicated to ending the senseless torture and mutilation of trees and shrubs.

look tidy when sheared, and only the yew reliably produces new growth when cut back to branches three years old or older.

There are relatively few broadleaf evergreens suitable for shearing; among them are boxwood, Japanese holly, evergreen privet, pyracantha, evergreen azalea and box honeysuckle. All are rugged and small-leaved.

Shearing wastes the beauty of many shrubs. I know gardeners who have never seen their shrubs bloom because they shear them after the flower buds have formed. They could shear after flowering, but they'd have to tolerate shrubs that looked a little long-haired. I'd rather have a graceful shrub with flowers than a formal one without.

In addition, shearing hides or destroys the beautiful bark and branching of plants such as camellia, strawberry tree, azalea, Japanese maple and eastern dogwood (believe it or not, some people in Seattle "lollipop" them).

Branches and flowers aside, shearing also limits the richness of a landscape. Where there could be striking contrasts of texture and form, shearing imposes uniformity. The fine-leaved boxwood and the bold-leaved viburnum lose character when sheared. A weeping Alaska cedar and an angular Pfitzer juniper contrast nicely when you prune naturally, but not when you shear.

Worst of all, shearing locks you into a high-maintenance routine. To explain why, I have to talk about the two basic pruning cuts: thinning and heading.

When you prune a branch back to its parent branch or to the ground, you make a thinning cut. When you shorten a branch by pruning anywhere between its tip and its base, you make a heading cut.

Since heading almost always encourages shoots to grow rapidly from the remaining buds and twigs on the branch, and often prompts dormant buds to pro-

duce shoots as well, you soon get a crowd of new shoots around a heading cut.

Shearing is basically wholesale heading. So year by year, a sheared shrub grows a little larger and a lot twiggy (see the drawings).

New shoots grow rapidly after shearing, as the shrub replaces lost leaves. Within weeks or months, you have to shear again.

Furthermore, shearing threatens a shrub's health. As a shrub hastens to replace lost leaves, it expends energy reserves to produce rapidly growing new shoots which are susceptible to drought, cold, pests and diseases.

Many shrubs lack the stamina to rebound. Barberry and spirea, for example, develop dead spots with repeated shearing. Vigorous shrubs tolerate shearing, but they still suffer stress.

The dense canopy resulting from shearing shades a shrub's interior. For lack of sunlight, a leafless zone develops, and eventually twigs die. Meanwhile, fallen leaves catch in the branches, making "bird's nests" that invite pests and diseases.

Unshearing

How do you restore sheared shrubs to their natural shape?

Have the right gear when you start. Use a good pair of bypass shears, the kind with curved blades that slide past each other. They cut cleanly and leave no stub when you cut a branch at the base. Have a pair of loppers and a pruning saw on hand, too. I like the small saws with folding blades. They fit in a pocket, and work in tight quarters. I usually wear leather gloves — sheared shrubs are scratchy.

Thin selectively, removing some of the twiggy canopy each year, and let time do the rest. You can unshear at any time of the year. I divide shrubs into two basic

categories and prune them differently.

Plants in the one group, which I call cane-growers, make a cluster of stems that branch very little, if at all; forsythias are representatives of this category.

The other group have a few main stems, and most branches rebranch repeatedly; deciduous azaleas are a good example. Let's call these the much-branched shrubs, and discuss them later.

Unshearing Cane-Growers

Cane-growers are tough and renew themselves readily from the base. I restore them by cutting a few stems off at the base and thinning a little each year, or by drastic renovation.

Cane-growers are easier to unshear than much-branched shrubs are. Each year, you remove a few of the biggest, oldest stems, cutting them as close as possible to the crown of the plant or to the ground. If loppers won't work, use the pruning saw. Also look in the canopy for the most snarled, twiggiest branches and cut them back to a side branch or bud, preferably one that faces outward so new growth will leave the interior open.

Remove no more than one-third of the canopy each year. If you take too much, many plants try to recoup by suckering profusely from the ground and sprouting from the remaining branches. The new shoots grow rapidly and make a bigger pruning job the next year.

For some very old shrubs, radical renovation may be in order. It's a drastic treatment — rather than thinning gradually for several years, you cut the shrub clear to the ground all at once.

Only tough deciduous cane-growing shrubs, such as forsythia, philadelphus, deutzia, kolkwitzia and potentilla, tolerate radical renovation; they resprout readily from the crown and roots. Keep in mind that a cut back shrub needs three years or more to look good again

and to flower.

[Ed. note: In general, total renovation is best done in late winter or early spring before new growth starts, when carbohydrate reserves in roots are high. For more on renovation, also called rejuvenation, see "Pruning Deciduous and Needled Evergreen Shrubs," on page 36.]

Unshearing Much-Branched Shrubs

With much-branched shrubs, the hardest part is getting started. You can take three approaches: Snip a lot of twigs; thin small branches; or cut out the worst twiggy clumps. I recommend that you combine all three practices, but concentrate on the last.

First, choose a portion of the canopy about a foot square. Then run a hand over it, feeling for the thickest clump of twigs. Push the clump aside to see how it branches, and prune it off with a thinning cut as the drawings illustrate.

Proceed around the canopy, section by section. Thin equally for the most part, but a bit more heavily around the base of the shrub than on the top to soften the look of a box, ball or bun. Finish the whole canopy this way. Then go back over it a square foot at a time, cutting out a few crossing twigs and small weak branches, and call it a day.

When you step back for a look, be prepared to see very little change. Heavily-sheared shrubs need time to resume natural shapes. Where you remove clumps the first year, nearby branches spring into the gap. Resist the urge to keep pruning. On many shrubs, heavy thinning invites trouble. If you remove more than one-third of the canopy at a time, you stress the shrub and provoke it into producing rapidly growing shoots.

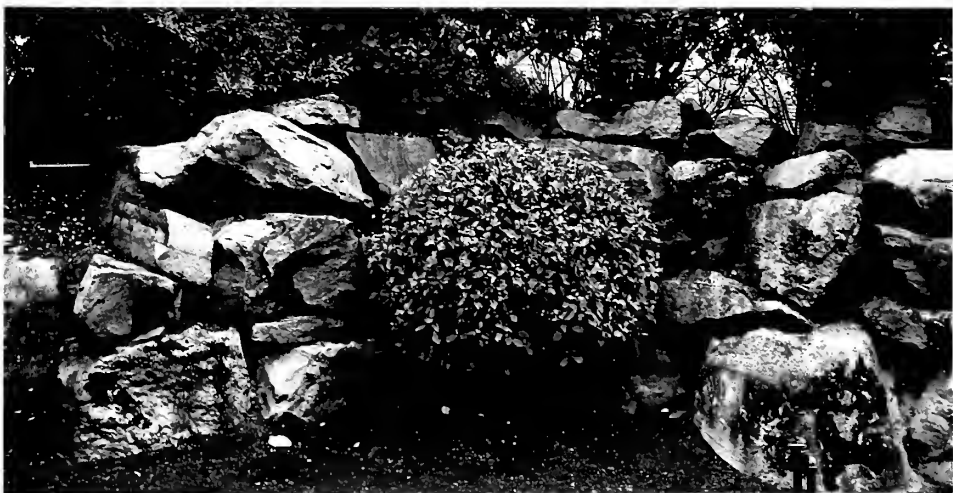
The next year, prune again. Take out the worst clumps and branches as you did the first year, and look for new growth that needs thinning. With light reaching



Shearing produces a temporarily tidy effect, but new shoots often grow vigorously, as shown here, and soon the shrub needs shearing again.

the shrub's interior for the first time in years, long-dormant buds come to life. This new growth will give you something to cut back to in the future if you choose to reduce the size of your shrub.

The sheared silhouette eventually breaks up. By the second year, the base of the shrub opens a little, and the canopy shows rolling contours. By the third year, the original layer of twigs is



Repeated shearing develops a dense canopy of leaves and twigs, as shown here. The shrub's natural shape gives way to a geometric silhouette, with all the branches hidden.

almost gone, and the shrub is evolving a natural pattern of branches.

The interior of a sheared shrub needs work, too. With big shrubs, I like to get inside the canopy and work up and out from the bottom. Whether you work from the inside or the outside, clean out leaves hung up in the forks of branches, and prune off all dead branches.

Remove any branch that grows inward through the center and out the other side. Cut out the worst of the branches that cross or rub other branches. As you thin wayward branches, step back frequently to check your progress. It's easy to cut too much. Heed the old saying, "Wander, ponder and prune."

A Final Plea

I hope I've persuaded you to prune rather than shear. But if you're not swayed yet, consider two last points. Sheared shrubs get bigger every year and eventually outgrow their site. If the shrub will regrow from old branches, you can cut it back drastically. You'll soon face the challenge of pruning a forest of vigorous new shoots, however. By contrast, if you prune

shrubs to natural shapes, you can control their growth with a few thinning cuts.

Pruning selectively is a lot less work than shearing. Some species, sheared, need several "mowings" per year to maintain formal rigidity.

When shrubs and trees are pruned for the "natural look," an hour a year will take care of most yards. Wouldn't you like to use the time you spend shearing to enjoy healthy, naturally shaped shrubs instead? ✂

The sequence of drawings below shows how to restore a sheared shrub to a natural open form, using thinning cuts and removing a third or less of the canopy each year. Cut crowded older branches and twiggy clumps, like the one in the first drawing at right, back to side branches. Thin new branches, shown here in green, by pruning them off at the base. (Pruned branches are indicated in gray.) Note that in the three years, the number of branches in the canopy drops by half. As the canopy loosens, clean up the interior of the shrub by removing lodged leaves and pruning dead branches.



First year:

Remove thickest clumps by cutting back to side branches. Thin shoots and trim stubs left by shearing.



Second year:

Continue to open canopy by cutting back old branches to side branches and thinning new growth.



Third year:

Shrub is regaining natural open form. Continue to thin old and new growth.

PRUNING ROSES

PETER MALINS
&
STEPHEN SCANNIELLO

All roses need pruning. If roses aren't pruned for a number of years, plants deteriorate in appearance and often develop more disease and insect problems, while the flowers become smaller and smaller.

HYBRID TEA, GRANDIFLORA AND FLORIBUNDA ROSES require annual pruning in the spring after winter protection has been removed. There is an old saying that roses are pruned when the forsythia blooms. In the New York metropolitan region, this is late March or early April. In other areas, rose pruning time will vary according to climate; check with your local rose society. If rosebushes are pruned too early, injury from repeated frost may make a second pruning necessary.

TOOLS AND SUPPLIES. For small pruning jobs, the only tools necessary are sharp pruning shears — the scissor-type

secateurs are best — and gloves. If the rose collection is larger, a small saw with pointed blade and loppers will help. Loppers are used to reach in and cut out large dead canes.

To discourage borers, apply Elmer's Glue or similar white glue to seal the cuts. Where roses are infected with brown canker, carry a can of denatured alcohol to sterilize shears after each cut.

REASONS FOR PRUNING. Prune to remove branches that are dead, damaged, diseased, thin, weak and growing inward, and branches that cross or interfere with other branches. This encourages new growth from the base, making the plant healthier and more attractive and resulting in larger blossoms.

PRUNING STEPS. Remove all dead and diseased wood by cutting at least one inch below the damaged area. Remove the entire cane if it's dead.

Remove all weak shoots. If two branches rub or are close enough that they will do so soon, remove one. On

PETER MALINS is the former rosarian and STEPHEN SCANNIELLO the current rosarian of the Brooklyn Botanic Garden's Cranford Rose Garden.

older, heavy bushes, cut out one or two of the oldest canes each year.

Cut back the remaining canes. The height to which a rose should be cut back will vary depending upon the normal habit of the particular bush and the personal preference of the gardener. The average pruning height for Floribundas and Hybrid Teas is between 12 and 18 inches, but taller-growing hybrids such as Grandifloras may be left at two feet.

Make cuts at a 45 degree angle above a strong outer bud. Aim the cut upward from the inner side of the bush to push growth outward and promote healthy shoots and quality flowers.

MINIATURE ROSES. Miniatures are roses with tiny blooms and foliage. Miniature roses do not need special pruning. Cut out dead growth and thin the centers. Miniature roses can also be pruned to maintain a shape or height.

RAMBLERS. The old-fashioned Rambler roses have clusters of flowers, each flower usually less than two inches across. They

often produce pliable canes 10 to 15 feet long in one season. Ramblers produce best on year-old wood, so that this year's choice blooms come on last year's growth. Prune immediately after flowering.

In summer, remove entirely some of the larger old canes after flowering. Tie new canes to a support for the next year.

LARGE-FLOWERING CLIMBERS. The canes of these roses are larger and sturdier than those of the Ramblers. Some flower just once at the beginning of the season, but some, called ever-blooming climbers, flower more or less continuously. They should be pruned once the rose is dormant. First cut out dead and diseased canes. Then, one or two of the oldest canes may be removed each season at ground level to make room for new canes. The laterals, or side shoots, should be shortened three to six inches after flowering. If the plant is strong, keep five to eight main canes, which should be tied to the trellis, fence or other support.

PRUNING IS AN ART. Prune with com-

mon sense. No particular technique is the only correct one. Any good rose gardener will find his own method. Pruning becomes an art, and you will learn from experience just how each plant should be handled. If you make a mistake, the plant will not die, and in time you will discover just what will produce the most and the best blooms.



Buds breaking in the spring.



New growth on spring-pruned canes.



Using sharp pruning shears, cut at a 45° angle just above an outer bud.



A bed of rose bushes before pruning in the spring.



The same bed of roses after spring pruning.

PRUNING HERBACEOUS PLANTS

TRACY DISABATO-AUST

Pruning is a practice normally associated with woody plants, but it also has broad application to herbaceous plants. When you deadhead, pinch, disbud or cut back herbaceous plants, you are pruning them.

Deadheading means removing flowers, one at a time or in clusters, which have faded or died. Many species will either flower for a longer period or rebloom if deadheaded.

Early bloomers such as pansies, and a host of summer flowering species and cultivars will keep blossoming far longer if deadheaded regularly.

Tidiness, too, is vastly improved by plucking spent flowers of some plants, especially daylilies.

Deadheading also can prevent self-seeding, which in the case of cultivars may result in inferior seedlings the next season (many cultivars do not "come true" from self-seeding). Columbines are particularly heavy seeders, and will come up even in gravel driveways if they're not deadheaded before going to seed.

Of course, you may opt against deadheading plants that produce ornamental seed heads after flowering.

If flowers appear at ends or among leaves of leafy stems (e.g. pansies, petunias), deadheading consists of plucking spent flowers or flower clusters.

To deadhead plants that have foliage at the bases of flower stalks, prune off stalks just above the foliage or just above new flower buds (e.g. shasta daisies, salvia, yarrow).

If plants have bare flower stems (e.g. hostas, daylilies, most spring bulbs), cut them just above ground level.

Spring flowering bulbs should be deadheaded before going to seed. Plants will look better, and the bulbs will store more energy for next year's blossoming. Prune old flower stalks as close to their points of origin as possible.

A deadheading technique that is akin to pinching (see below) is the removal of flowers as they form in order to promote foliage. This is beneficial to colorful ornamental plants such as coleus, and to herbs grown for culinary foliage, such as basil, oregano and the mints.

Pinching is removing about half an inch of growing tip. This creates bushier and more compact plants and

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decreases the need for staking. Pinched plants will generally have more, but smaller, flowers.

Many annuals benefit from pinching at planting time. The resulting plants are sturdier, bushier and more floriferous.

Similarly, many late summer and autumn flowering plants benefit from pinching.

Chrysanthemums give best fall displays if pinched, starting in spring when growth is six or so inches high and continuing every two weeks until July 15 in the Midwest. Most cultivars of Michaelmas daisies benefit from a couple of early pinchings.

Because pinching tends to delay flowering, a bed of one species or cultivar may be enticed to show color for longer than normal periods. For example, pinch one third of the plants in the bed well before normal blooming time. A week later, pinch another one third and pinch the rest another week later.

Disbudding is removal of superfluous flower buds only, long before blooming. If side buds are removed and only the terminal bud is left, results are a much larger flower and a longer stem. If the main bud is removed, side shoots will produce more, but smaller, flowers.

Disbudding is usually used by exhibitors and/or flower arrangers with plants such as chrysanthemums, dahlias, carnations and peonies.

Cutting back is the relatively severe practice of removing one-third or more of the upper portions of plants in one courageous swoop.

Many low-growing spring-flowering rock garden plants and edging plants should be cut back by one-half after flowering. Examples are evergreen candytuft, moss phlox, rock cress and snow-in-summer. Some gardeners cheat at this chore by using a string trimmer. Taller plants that benefit from cutting back after flowering are *Veronica latifolia*, catmint and spiderwort.

Some normally tall growers, such as great blue lobelia, ironweed, boneset and native asters, may also be cut back long before flowering, by half when plants are four inches tall and again when 12 to 16 inches high.

Perennials with one heavy bloom period, including golden marguerite, lilyleaf ladybells and painted daisies, should be cut back by one-third after flowering simply to keep plants tidy.

Annuals such as petunias and impatiens may become leggy and disheveled



Before: New growth emerging from base of delphinium.



After removing old foliage new growth buds begin to form.

by midsummer. Enthusiastic cutting back will revive them for a late summer show.

A good haircut during the heat of summer does wonders for the ground cover plant known as bishop's weed or goutweed.

Some plants, such as bee balm and 'Alaska' shasta daisy, produce new growth at ground level in late summer, when shabby bloomed-out upper portions may be cut back to the new growth.

And at the end of the season as winter approaches, foliage of most herbaceous perennials should be cut to the ground and removed from the garden. This spruces up the garden and reduces chances of insects overwintering in dead leaves and stems.

Exceptions to prewinter whacking are evergreens such as sea pinks, European ginger, evergreen candytuft, *Sedum spurium* and some of the ferns. 🌿



Cut back *Anthemis tinctoria* by one third after flowering.



Lobelia siphilitica was pinched back two months ago.



Pruning *Anthemis tinctoria*.

HEDGE PRUNING BASICS

JAMES A. MACK

Hedges, like other ornamental plantings, have function as well as beauty in the landscape. Hedges dictate traffic flow, frame attractive views, screen undesirable views and define space.

I have seen examples of both magnificent and extremely poor hedges over the years. Several variables determine success or failure with hedges. Perhaps the most important step (after site preparation and planting) is to start them off from the very beginning with sound pruning and shaping.

Even the best choice of plants in an ideal location will make a mediocre hedge — or worse — with inadequate early training.

Formal Versus Informal Hedges

Formal hedges, composed of hard, crisp lines, are often used to complement geometric architectural shapes, to define spaces sharply, to provide backdrops for smaller, showy plants or to screen undesirable views. Deciduous or evergreen,

formal hedges are usually grown for quality of foliage, not flowers.

Informal hedges may serve several of the same purposes. However, they are often grown primarily for ornamental flowers, and secondarily for foliage. Informal hedges are best used free-standing to offer full appreciation of seasonal beauty.

First-Year Pruning

Too often a novice gardener will plant a hedge with the intent of forming a tall hedge in the shortest possible time. The result is a spindly hedge, sparsely branched and inadequately clothed with foliage, especially at the base.

It's important to spend enough time during the first three or four years properly training the plants to grow into attractive and functional hedges.

Initial pruning is aimed at restricting top growth to encourage side branching at the base.

Leaves need sufficient light to sustain them. Shading of lower limbs by upper ones, due to improper pruning (or lack of pruning) results in top-heavy hedges with most of the foliage in the upper half or one-third of the plants.

To avoid this, always prune hedges

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wider at the base than at the top. This allows light to reach all the leaves and encourages branching and foliage clear to the ground.

In regions with moderate to heavy snowfall, it is wise to round the top surface or even taper it to a blunt point. This aids in shedding of snow before it can build up and damage the hedge.

Directly after planting deciduous hedges (both formal and informal), string a line (using two or more stakes) parallel to the ground along the hedge. The height of the line should be midway between the shortest and tallest plants.

Prune ("tip out") upright branches of the taller plants down to the vicinity of the string. Cut branches cleanly just

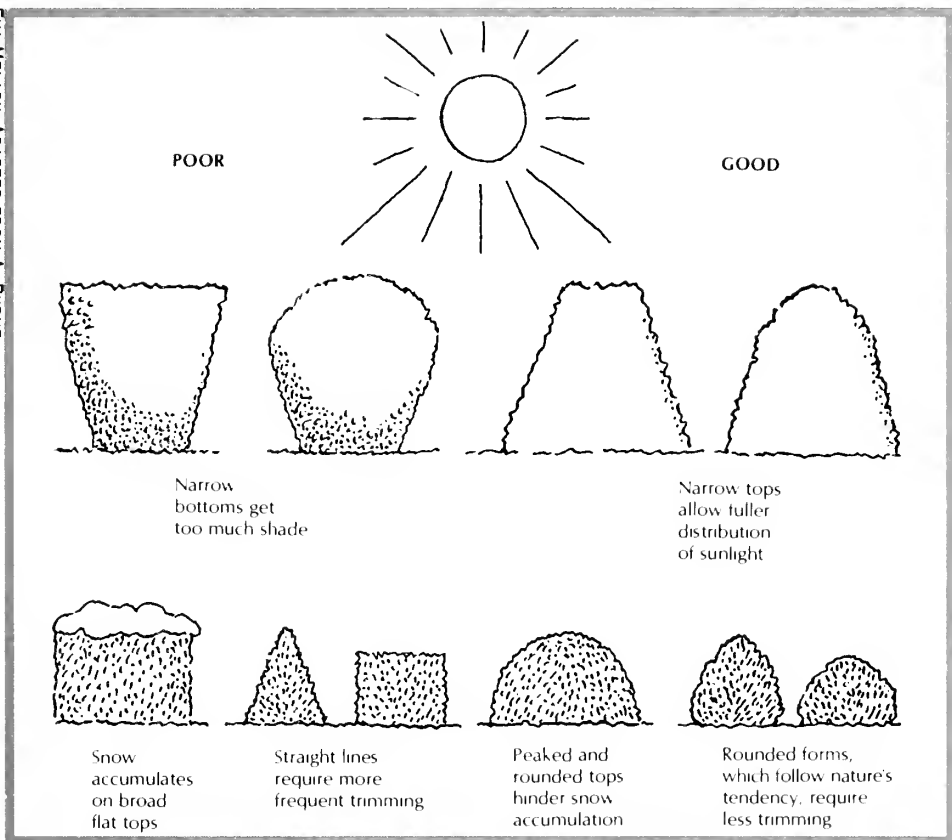
above side-branch junctions, or just above obvious dormant buds. Make slightly slanting cuts about one-fourth inch above side branches or buds that remain.

Allow plants below the string to produce upright growth till they reach the height of the other plants before tipping them out.

After pruning upper shoots of the taller plants, clip back side branches of all plants, removing no more than one-half of their lengths, to loosely approximate a pyramidal shape.

Do not prune back needleleaf or broadleaf evergreens, usually used for formal hedges, as hard as deciduous plants. But the basic shaping process applies, especially to overly-long side shoots.

In all cases, it's best to use scissors-type





Blue beech (*Carpinus caroliniana*) makes a fine deciduous hedge.

hand shears to assure clean and well-placed cuts.

Second Year and Beyond Formal Hedges

During second and subsequent growing seasons, formal hedges, whether evergreen or deciduous, should be allowed to proceed slowly to their ultimate heights via regular pruning.

Each shaping should remove no more than one-half of new shoot growth. Most evergreen hedges, needle or broadleaf, will need only one pruning in midsummer.

Deciduous types, especially fast-growing species like privet (*Ligustrum*), may need monthly pruning to maintain proper density of branching.

In colder climates (winters with temperatures often below freezing), avoid pruning hedges after mid August. Later pruning may encourage soft new growth that won't have time to harden off before winter.

Informal Hedges

Informal hedges, as a rule, can be left mostly to their own devices during their second season, with spot pruning here and there to head back occasional rampant shoots.

An exception is when low side branches do not develop satisfactorily. If this is the case, shorten terminal shoots by one-half, to encourage development of basal branches.

Once a good base is developed, an informal hedge should be shaped only when necessary, and allowed to grow mostly naturally to its full ornamental potential.

Maintaining Hedges

Once a hedge has developed fully into the desired shape and size, the amount of maintenance pruning will be dictated by the growth characteristics of the species and the tastes of the gardener. Usually,



Hemlock hedge (*Tsuga canadensis*) trimmed so that the base is wider than the top.

timely attention once a year will suffice.

Be forewarned that formal hedges of some species will not tolerate pruning away of outer foliage; bare inner branches thus exposed may not leaf out again. Other species, such as the evergreen yews (*Taxus*) and most deciduous plants, will sprout readily from older wood.

When to prune is an important consideration for informal flowering hedges. Spring-flowering species, such as forsythia, mock orange (*Philadelphus*) and lilacs (*Syringa*), will not flower to their full potential if pruned in the dormant season before flowering. For maximum blossoming, prune these species just after flowering.

Summer-flowering species, such as sweet pepperbush (*Clethra alnifolia*), abelia and rose-of-sharon (*Hibiscus syriacus*), are best pruned in winter or early spring before new spring growth.

Pruning Tools for Hedges

I am often asked which pruning tools are best for hedges.

For informal hedges, deciduous or evergreen, I prefer a scissors-type hand pruner. Though it may take a bit longer, pruning with this tool allows carefully chosen cuts to be made, minimizing damage to foliage, especially on broadleaf evergreens such as rhododendron and holly (*Ilex*).

Formal hedges can be trimmed with either power trimmers or manual hedge shears. Manual shears deliver cleaner cuts, minimizing chewing of leaves and twigs. Electric or gasoline powered trimmers are faster, and if cutting edges are sharp and the operator is skillful, will do a neat job on fine-textured plants such as yews, abelia, privet and hemlock (*Tsuga*).

Following basic procedures for pruning can establish and maintain beautiful, functional hedges for many years to come. 🌱



Taxus hedge defines a wavy margin.



Korean boxwood trimmed so that the top is rounded to shed snow.

MOWING IS PRUNING, TOO

ELIOT C. ROBERTS

Fertilization, pest control, aeration of the root-zone when necessary, irrigation and mowing are all important lawn care practices. The last two are the most important and often determine the success or failure of the other cultural endeavors.

Importance of Mowing

Mowing is particularly important. Not only does clipping height influence turf grass vigor and persistence, but clipping frequency determines the amount of foliage removed at one time and thus influences the rate of regrowth as well as the need to bag and remove grass clippings from the site.

Mulching mowers chop leaf segments into tiny pieces that sift out of sight into turf, negating need for removal of clippings (and, contrary to popular opinion, the pulverized clippings do not cause thatch).

EDITOR'S NOTE: Several states now have regulations that ban clippings, leaves and other plant materials in landfills.

In general, mowing at any given height should be done often enough so as to clip no more than one-third of the grass height at any one time. E.g., if grass

is to be cut to two inches, it should be mowed when it reaches three inches. Thus, one inch, which is one-third of the height when mowed, is removed.

If grass is to be cut to one inch, it should be mowed when it grows to one and a half inches, so one-half inch is removed.

It follows that mowing frequency should be doubled when mowing height is halved.

Mowing height and frequency can and should be adjusted in accordance with the growth of the turf. Heat, cold, moisture, drought, nitrogen fertilization and many other cultural practices influence the rate of lawn grass growth and development. These conditions create stress or relieve stress within the turf. Mowing must not create more stress in plants that are already weakened.

Adjustment and operating conditions of mowing equipment become very important in these instances. Reels and bed knives on reel mowers and cutting blades on rotary mowers must be sharp and well adjusted. Cleanly cut grass blades heal quickly with little damage to the plants.

Considerable research has been conducted on the need for mowing in the development and maintenance of fine turf. This practice is necessary to cause tillering (growth of new shoots from the base of a grass plant) so that turf density is increased. A good tight turf is not only pleasing to look at, it also helps prevent

DR. ELIOT C. ROBERTS, soil scientist and turf specialist, has served on university faculties in Massachusetts, Iowa, Rhode Island, and Florida. He has written more than 200 technical papers and popular articles. Currently, Roberts is Executive Director of the Lawn Institute, Pleasant Hill, Tennessee.

weed seedlings from getting started. Grass should occupy space needed by weeds and actually crowd them out.

There is a limit to how low a given turf should be cut. Below the optimum height of cut, too little leaf surface is available for photosynthesis and a weakened turf results. Density lessens and the turf cover opens up to expose soil. Weeds become established more readily. Root zones of turf grasses shrink under these conditions as roots die back and are replaced by regrowth. In effect, cutting too low reduces organic food substances and the turf suffers malnutrition. Under extreme conditions, such grass may starve to death.

Raising the height of cut allows more leaf surface and creates at least the potential for recovery and resumed health and vigor.

Even small increases in cutting height produce dramatic increases in total leaf surface, which in turn increase vigor of the grass. For most grass species, raising mower blades just one-eighth inch from minimal cutting height results in the equivalent of more than 300 square feet of leaf surface per 1,000 square feet!

One-fourth inch more cutting height gives 600 to 900 more square feet of leaf surface per 1,000 square feet; one-half inch higher, from 1,250 to 1,800 more square feet of lawn equivalent.

Mowing Heights

Each lawn grass cultivar has a recommended clipping height which will make it most vigorous and healthy. These heights vary from less than one-fourth inch for creeping bentgrasses on golf greens to about three inches for some of the coarser, non-spreading type grasses. Reel mowers are best suited for close cutting and rotary mowers do a good job at clipping heights from one and one-half to three inches. Lawn grasses cut much above three inches fail to form a nice uniform, close knit turf.

Grasses for Cool, Humid Regions

KENTUCKY BLUEGRASSES — on the average, Kentucky bluegrasses should be mowed at about one and one-half inches. All natural types do best at this height of cut. Some new, named cultivars have a minimum mowing height of about one inch. Follow instructions on the seed container.

FINE FESCUES — including red fescue, creeping fescue, Chewings fescue and hard fescue, should be mowed at one and one-half inches. Actually, these grasses will tolerate clipping at one-half inch or lower when free of competition from more vigorous grasses. In partial shade (no grass will grow in full shade), elevation of the clipping height to two inches is good practice.

TURF-TYPE PERENNIAL RYEGRASSES — form a good solid turf when clipped at two inches. Many of the new named cultivars have been bred to tolerate a one-inch height. On lawns and sports turf, mowing from one to two inches high is about right.

TURF-TYPE TALL FESCUE — the old cultivars of turf-type tall fescue require a clipping height of about three inches. Newer cultivars perform best when cut at two inches. Now there are new dwarf cultivars that can tolerate clipping as low as one inch. Check the seed container for clipping height for your selection. In general, these grasses perform well when cut higher than the minimum specified.

COLONIAL BENT AND CREEPING BENT GRASSES — are the closest clipped of the cool season grasses. Creeping bent grasses used on golf courses are not recommended for home lawns. They require too much care.

Colonial bent grass cultivars look best when mowed from one-half to one inch high. Sow these with fine fescue (25% bent grass and 75% fine fescue) and mow the mixture at one inch.

GRASS MIXTURES — Most lawns in northern, cool, humid regions are mix-

tures of two or more different grasses. Each of these will have a preference for height of cut. By raising or lowering the height during the growing season, it is possible to encourage one grass at the expense of another. In general, mow at a height that will favor that grass or those grasses most desirable in creating the quality of lawn desired.

EDITOR'S NOTE: Many authorities in Ohio and neighboring states recommend cutting most mixtures at two and one-half inches, especially if they are not irrigated.

Southern grasses used in the warm, humid regions of the country are generally not planted as mixtures but are grown as monocultures.

Grasses for Warm Regions

BERMUDA GRASSES — are the closet cut of the southern grasses. They are used on golf greens and will tolerate a cut of one-fourth inch or less. For lawns, bermuda grasses should be mowed at heights of

from one-half to one inch.

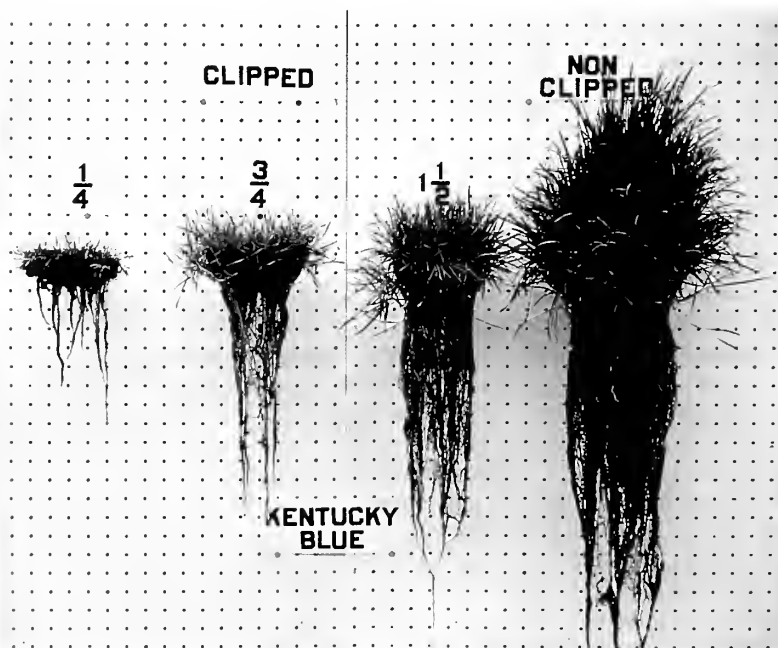
ZOYSIA GRASSES — get soft and spongy when mowed much above one inch. They perform best when cut close to keep thatch from forming and when top-dressed to maintain a firm surface.

ST. AUGUSTINE GRASSES — are usually cut higher in the Upper South (up to three inches) and lower through southern Florida and along the Gulf Coast (down to one inch). These grasses tend to get soft and thatchy when cut high, necessitating thatch control.

CENTIPEDE GRASSES — make nice looking lawns when mowed at about one and one-half inches.

BAHIA GRASSES — are open in habit of growth and make a second-rate turf at best. Bahia grass lawns look best when clipped at three inches.

BUFFALO GRASSES — make an attractive dry-land turf where lack of water precludes better grasses when cut at from two to three inches. 🌿



Kentucky bluegrass clipped at 1/4, 3/4 and 1-1/2 inches is compared with bluegrass not mowed to see the effect of mowing on root development. Clipping much below 1-1/2 inches restricts root growth so much that Kentucky bluegrass suffers, particularly during summer drought.

ESPALIERS

ALAN D. COOK

An espalier plant is one trained to grow flat against a wall, trellis, fence or other support. In the old European and English traditions, branches were trained to symmetrical and often intricate geometric patterns (Fig. 1). Modern styles, while ignoring symmetry, achieve graceful balance through sweeps and curves as well as random patterns (Fig. 2).

Espaliers make great conversation pieces, but they also can do many horticultural jobs. An eighteen-inch strip of soil between a walk and a garage wall is a spot that calls for a shrub or small tree that's trained tall and wide and very thin. Patio boundaries are amenable to trellis-supported espaliers. Stone walls are often better dressed with flat-trained evergreens than with rampant vines.

Espaliers also can feature flowers followed often by fruits or berries, and a fence-supported orchard of espaliered dwarf fruits can produce gratifying harvests in very small spaces. Never remove the short fruiting spurs along the branches of fruit trees, unless they become too thick — that is, closer than two or three inches apart.

A Few Things to Keep in Mind

① On walls, north and east exposures minimize winter damage, but some

plants won't get enough light on north walls to perform satisfactorily.

② Select proper plants for the location. A rhododendron or dogwood, which is shade tolerant, might be suitable for a north wall, but only in well drained, slightly acid soil. Thorny plants would not be desirable beside a walk. Large areas need fast-growing plants. Be sure the plant is perfectly hardy in your climate. Espaliering is time-consuming; gambling with "iffy" plants is better left to conventional culture.

③ Have a definite design in mind and work toward it from the start. Unless, of course, some other design seems better as the original one develops or falters.

④ Heavy yearly pruning is usually best done in early spring, or, on spring-blooming plants, immediately after flowering. Touch-up grooming should take place as often as necessary to maintain desired neatness.

⑤ As a rule, side shoots should be allowed to grow to about 12 inches before shortening, and a few leaves should be left after pruning. Branches that are a part of the pattern should be tip-trimmed only after they reach desired length.

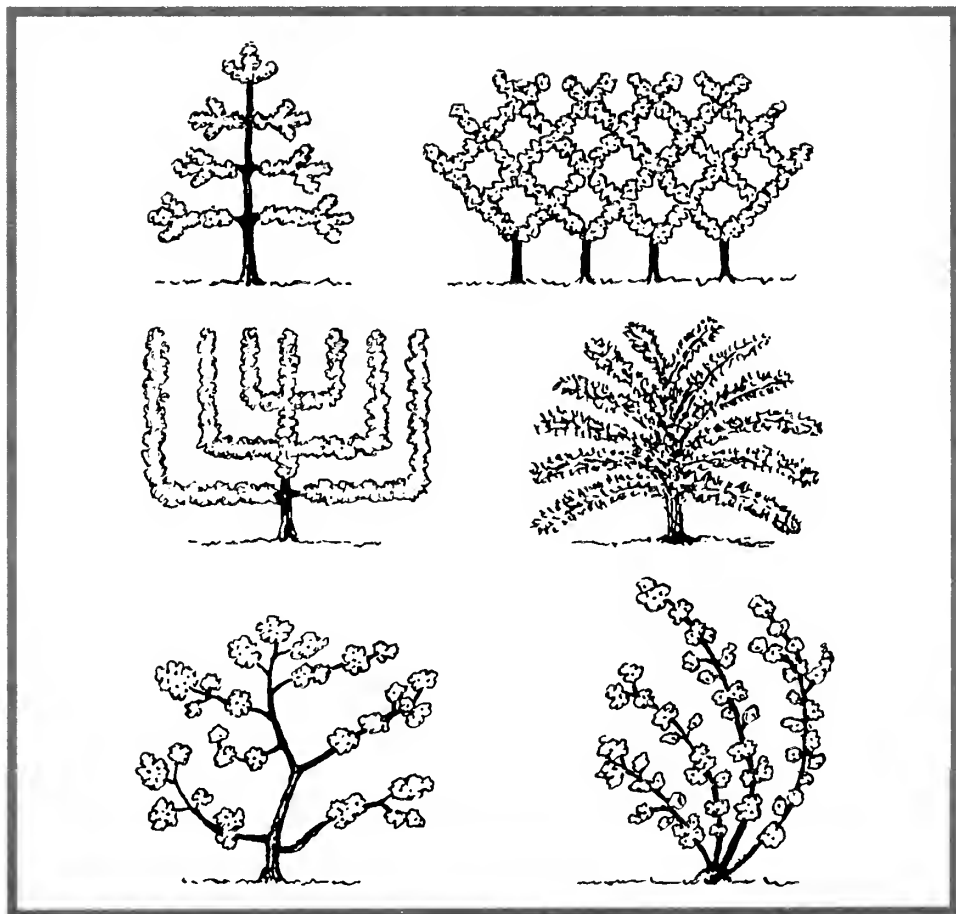
⑥ Think about methods of attachment. On masonry, drill holes and cement in rustproof hooks or eyes.

Against wood construction, trellises are advisable for support. Metal rods welded together make fine trellises.

⑦ Use soft material for tying branches to supports. Pieces of insulated copper wire, soft cord or even strips of lead can be used for this purpose. Check the attachments twice a year and loosen them as necessary to prevent constriction of growth.

Suggested Plants

Almost any woody plant can be used for the purpose, but some are superior. A partial list includes: flowering quince, flowering dogwood, cotoneaster, hawthorn, euonymus, forsythia, American holly, magnolia, apple and crabapple, cherries, flowering cherries, plums, pears, pyracantha, yews and viburnum.



DRAWING BY ALAN D. COOK

Top and center: Espaliering single or multiple plants can be simple or intricate. Training must start when plants are young and supple.
Bottom: Modern, more casual espaliers of flower arrangement patterns.

LIVING SCULPTURE AT LONGWOOD GARDENS

PAM ALLENSTEIN

Topiary is a highly individual art form, a kind of living sculpture. Marrav's New English Dictionary of 1928 defines topiary as "the art of cutting trees and shrubs into quaint devices." The art of topiary has roots in the classical Greek and Roman period. Through the centuries, topiary as a horticultural art form has been developed by the French, Dutch, English and more recently the Ecuadoreans and the Americans.

The Topiary Garden at Longwood Gardens in Pennsylvania was started in 1936 by Pierre S. du Pont with eleven large rounds, four cones and a horseshoe-shaped hedge to accent an Analemmatic sundial. In 1958 thirty more figures were introduced from the Bismark Estate in Bayville, Long Island, with later additions from an Illinois nursery (Charles Fiore, Prairie View), Taylor Arboretum in Pennsylvania and Longwood's own nursery.

The current display features massive geometric figures, cones, spirals, a pyramid, "cake-stands" topped with birds, a

chair and table and several animals. Located in a sunken garden surrounded by stone walls and hedges, the topiaries are protected from drying winds while enjoying a sunny exposure.

The actual mechanics of pruning the topiary figures is much like clipping hedges. In the past gardeners at Longwood used hand clippers to prune the topiary. Gardeners currently use electric hedge shears for the annual summer shearing. Hand pruners are used to remove knots, and for cleaning and deadwooding in the late winter. A battery-powered hydraulic lift replaces boards and scaffolding once used to reach the tops of the taller pieces. Today's approach emphasizes safety. Gardeners are required to wear gloves, eye protection and earplugs or earphones to muffle the sound of noisy shears.

Topiary gardening requires an extra dose of patience. Gardeners must pay close attention to detail in line, proportion and symmetry. The topiary figures at Longwood are cut free form. Occasionally, templates, plumb lines, strings or measuring sticks are used to make corrections or adjustments to the geometric shapes. Not using frames allows gardeners the flexibility to alter a shape if

PAMELA ALLENSTEIN is in charge of the Topiary Garden at Longwood Gardens. She recently completed her M.S. in Public Horticulture Administration through the Longwood Graduate Program.



Longwood Gardens has a large collection of topiary.

desired. Each topiary "artist" may contribute to the development of topiary specimens through his or her imagination

and skills. Record-keeping and sketches help to "pass on the legacy" through generations of gardeners.

TOPIARY THE EASY WAY

In olden days, a shrub pruned into a bird was sheer artistry, carefully crafted by a talented and patient person with pruners.

Now, we can put a wire mesh cage of desired design over a small plant, blithely lop off anything that grows through the mesh, and eventually create a topiary.

Some mail-order sources of topiary frames:

GARDEN MAGIC

2001 1/2 Fairview Road
Raleigh, NC 27608
(919) 833-7315 (free catalog)

KENNETH LYNCH & SONS, INC.

84 Danbury Road
Wilton, CT 06897
(203) 762-8363 (catalog of 10,000
garden items, \$8)

TOPIARY, INC.

41 Bering
Tampa, FL 33606
(813) 254-3229 (free catalog free)

VINE ARTS

PO Box 83014
Portland, OR 97203-0014
(503) 289-7505 (catalog, \$2)



Pruning is done twice yearly with power equipment and a hydraulic lift.

Although many plants can be used for topiary, the specimens in Longwood's Topiary Garden are several varieties of yew (*Taxus* spp.). Yew responds well to hard pruning and grows at a moderate rate. The natural habits of various varieties — low and spreading or mounded and upright — help determine which variety will lend itself best to a particular shape. Longwood's topiaries are pruned generally once a year, from June through August. More detailed figures and those in prominent positions may be groomed several times during the season. Any major changes are made in the late winter or early spring when new growth can quickly fill in bare patches.

Theories on pruning techniques and timing differ with the particular plant used, growing conditions, availability of time and labor and the judgment of the individual gardener. It is important to prune back to last year's cuts, if you don't want the figure to increase in size. In colder climates, another crucial step is keeping the topiaries free from snow and ice, which can spoil the shape and even damage major limbs.

In addition to Longwood's Topiary Garden near Kennett Square, Pennsylvania, there are three other excellent topiary displays in the Northeast: Ladew Gardens in Monkton, Maryland, Green Animals in Portsmouth, Rhode Island, and Colonial Williamsburg in Williamsburg, Virginia. These gardens display some of the best examples of living sculpture in the country. 🌿

LADEW TOPIARY GARDENS FOUNDATION

3535 Jarrettsville Pike
Monkton, MD 21111
(301) 557-9466

GREEN ANIMALS

The Preservation Society of Newport County
118 Mill Street
Newport, RI 02840
(401) 847-1000

COLONIAL WILLIAMSBURG

Drawer C
Williamsburg, VA 23187
(804) 229-1000

LONGWOOD GARDENS, INC.

P.O. Box 501
Kennett Square, PA 19348-0501
(215) 388-6741

PRUNING & TRAINING BONSAI

ARTHUR O. PATZNICK

Bonsai is the ancient Far Eastern art of dwarfing and training plants to represent trees in their natural environments.

Top Pruning and Training

Before starting to prune and train a bonsai, one should study the plant in question and decide what style the finished bonsai is to be — upright, leaning, cascading or other style.

When starting a new bonsai, or when renovating an older specimen that has been neglected, drastic pruning is in order. Many branches may be removed and most or all remaining branches thinned and shortened. The main trunk may be shortened as well.

Experience is desirable and courage is essential for a grower performing drastic pruning. The framework to be left, a mere skeleton of the plant prior to pruning, depends on the chosen style.

ARTHUR O. PATZNICK, *Superintendent of The Dawes Arboretum, Newark, Ohio, was trained in bonsai by Frank Okamura at Brooklyn Botanic Garden in 1968. Since then, Patznick has taught numerous bonsai classes and workshops and organized the Ohio Regional Bonsai Show.*

Drastic pruning is best performed when plants are dormant, prior to the beginning of new growth.

Once a style is chosen and initial drastic pruning accomplished, a bonsai can be trained into full beauty by yearly pruning.

The best time to prune deciduous species is after new shoots have fully developed, but not matured.

The same is true for evergreens other than pines, spruces and firs, which should be pruned by pinching off one-third to two-thirds of “candles” of new growth before they expand fully.

Pinching with thumb and forefinger is suggested; cutting with shears leaves blunt, unattractive needles at the points of pruning.

General Rules for Pruning Bonsai

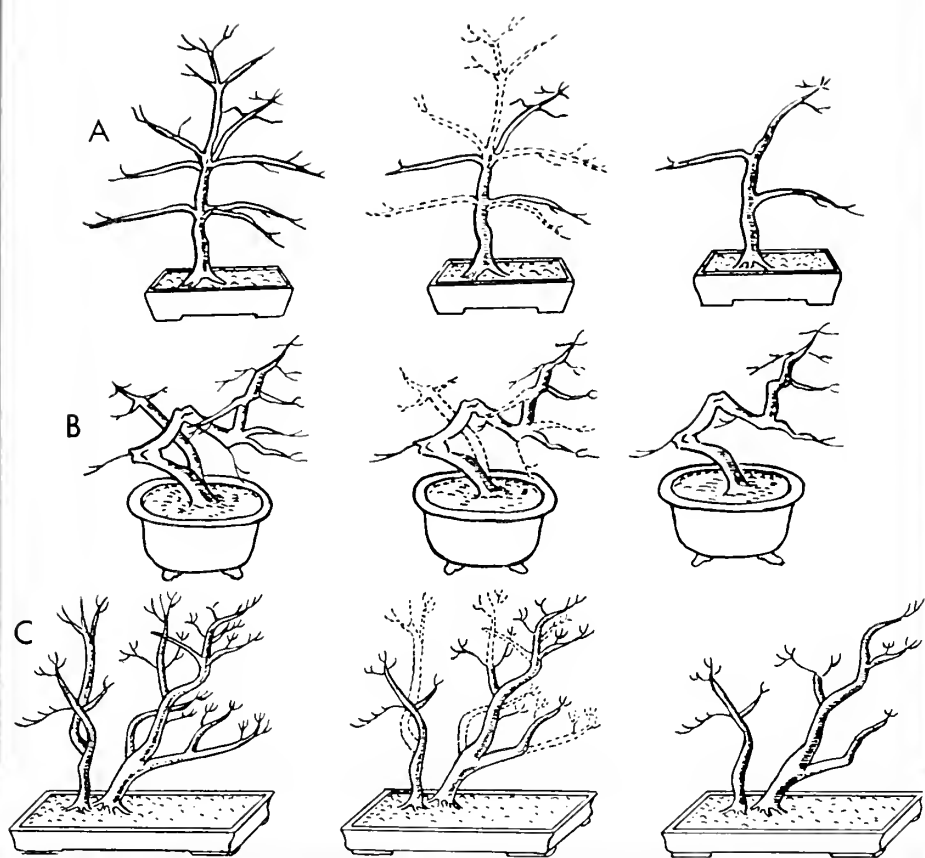
If two or more branches close together are growing in the same direction, leave only one, usually the smallest.

If two branches cross, one must go.

Remove branches that grow inward.

If one branch is directly above another, chances are one must be removed. Which one depends on the chosen style.

Make all cuts cleanly, with sharp tools



PRUNING FOR BASIC FORM

In training bonsai from nursery-grown trees, it is important to remove all but the key branches. These will form the simplified skeleton of the bonsai-to-be, since it is from these limbs that new leaves and new shoots will grow. Foliage masses can be created around each branch if new shoots are pinched back as they develop.

In pruning the five-year-old tree **A**, only one branch is allowed to remain at each level. This avoids the oversymmetrical effect of opposite branches, creates a feeling of openness between branches and accentuates the diminutive trunk. Tree **B**, a distorted specimen such as can occasionally be found in a nursery or growing wild, is pruned mainly to simplify the branch structure and emphasize its asymmetrical trunk. The trees in **C** are a kind one is sometimes fortunate enough to discover: specimens with interesting branch patterns, selectively pruned, are immediately attractive as bonsai.

that are large enough to make the cuts easily, without strain.

Do not leave stubs when removing branches, but do cut just outside the branch collars, at angles equal but opposite to angles of the branch bark ridges.

Cut back to buds, or side branches, when shortening branches.

Don't be too hasty about removing dead wood. Sometimes it is aesthetically useful.

Wiring

Branches and even trunks of bonsai trees can be trained by use of wire, twisted spirally along the areas to be trained. Thus, branches can be bent into desired angles and directions. After several months, remove the wires and branches will stay in their new positions.

Inspect wires frequently during seasons of vigorous growth, lest wires leave unnatural grooves.

When wiring, gentle is the key word — no matter how stubborn a branch may be.

Annealed copper wire of various thicknesses is used by many growers. Ordinary copper wire is readily annealed (made softer) by heating in an oven.

Soft aluminum wire that needs no annealing is also used.

Root Pruning

Root pruning usually goes hand in hand with repotting. Root pruning is necessary whenever a bonsai becomes root-bound in its container. Roots should be checked annually.

A container-grown plant is root-bound when a mass of tightly woven roots cover most or all of the growing medium. Screens over drainage holes, in extreme cases, may be completely covered with roots.


Deciduous species usually require root pruning every two to three years; evergreens, every three to five years.

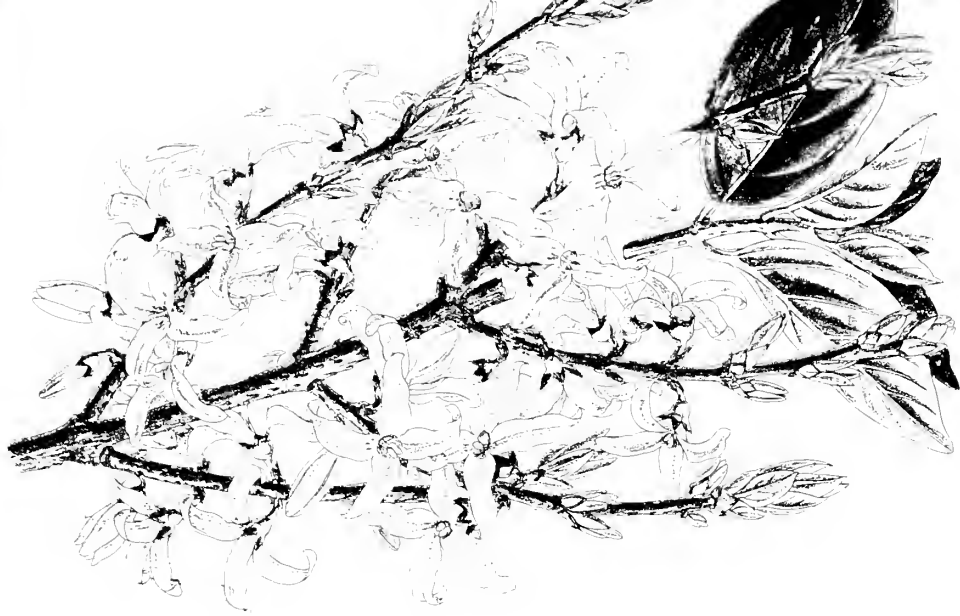
Root pruning is best done when plants are dormant, before new growth begins.

To root prune, allow the root medium to become moderately dry. Remove the root mass from the container and unravel roots carefully, using fingers and perhaps a cheap dinner fork with tines spread, or a special tool called a root hook.

Then carefully dislodge about one-third of the medium from around the roots.

With sharp pruners or snips, trim roots so that only about an inch of each root extends beyond the remaining medium. Always cut back to a lateral root no matter how tiny.

Then, with fresh medium, repot the bonsai into the same container, or a larger or more artistically desirable one. 



PRUNING WITH A DECORATIVE EYE

LEONA WOODRING SMITH

Careful examination before you start pruning can help you find interesting shapes and textures sculpted by nature. Unusual curves and angles resulting from wind, rain and sun can provide indoor beauty for your home.

LEONA WOODRING SMITH, *freelance writer and lecturer, is the author of **The Forgotten Art of Flower Cookery**. She and her husband operated Heritage Gardens, a herb and everlasting flower business in Edenton, North Carolina.*

Attractive lines of fallen tree limbs, gnarled roots and twisted branches are being used commercially to display clothing, jewelry and other baubles.

Designers are adding new dimensions of beauty to homes by using the simplicity of natural wood sculpture, perhaps to fill an empty corner, or maybe to sweep one's eyes upward to another level.

Flower arrangers have long depended on the interesting forms of tree branches for basic outlines. Opportunities are endless.

Decorative pruning throughout the year can provide something special in every season — flowering branches in late winter and early spring, green leaves for arranging summer flowers, colorful foliage and berries in the fall and greenery for the Christmas season.

Who hasn't admired a vase filled with sprays of red-berried holly at Christmas-time, or lingered over one filled with blooms of forsythia and pussy willows in February while outside there is still snow on the ground?

A truly dedicated decorative pruner may delay cutting of certain branches until a more suitable season for decorating with them.

For example, while pruning in spring, one might postpone cutting an unwanted (on the plant) evergreen branch that would make a perfect background for a summer floral arrangement.

Or, while fall pruning, leave a few well-budded branches of forsythia for spring forcing. Or temporarily spare a wayward holly branch, and prune it later for holiday decorating.

Spring

Forcing flowering and leafing branches indoors can often be accomplished before springtime arrives outdoors. Forcing results will vary, depending upon geographical location, weather and species.

In late winter start checking the bushes and branches for swollen buds. Some of the best woody branches for forcing flowers are: apple, forsythia, plum, birch, lilac, pussy willow, cherry, magnolia, dogwood, redbud, peach, witch hazel and maples (red and silver).

Forced foliage is useful, too. Try branches of willow, privet, buckeye, honeysuckle and other species that leaf out early in spring.

To condition for indoor blooming,

crush the base of branches to aid water intake. Place them in a container of warm water and keep in a warm place, but not next to the fireplace, radiator or other heat source, lest buds dry out before opening. Change the water every three or four days.

It may take several days to several weeks, depending upon the time of season and the nature of the branch, but it's a rewarding adventure to watch the new growth unfold.

Summer

Flowers are abundant everywhere in the summer months, begging to brighten any or all rooms in the house.

Since foliage is essential in all flower arrangements, prune with a decorative eye. Deciduous shrubs and evergreens provide greenery for flower arranging, and branches can provide basic outlines. Plan a design, however, before cutting, so precious material will not be wasted.

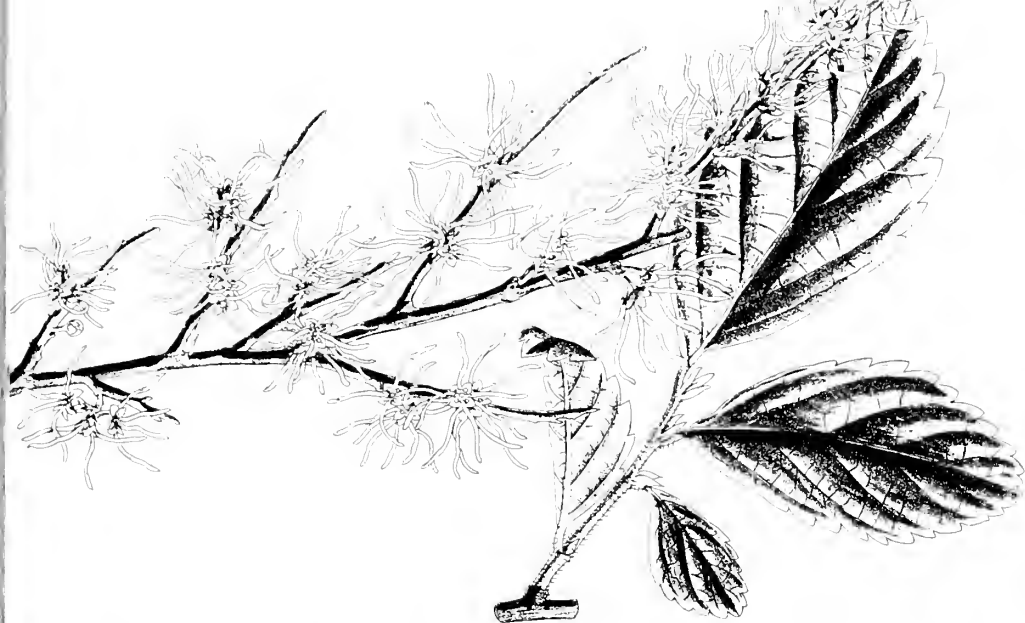
Branches of graceful cotoneaster, leucothoe, witch hazel or laurel will provide natural curves. Snippings of yew, boxwood or juniper can add fullness to arrangements. Carefully chosen, well-shaped evergreen branches can provide design backgrounds that will last through several changes of floral accents.

Autumn

Fall prunings offer an abundance of decorative material. The variance of tints and tones and smooth and rough textures of an interestingly formed branch can make it a natural sculpture.

Showy fruited branches of pyracantha, bittersweet, beautyberry, leucothoe, cotoneaster, some of the shrub roses, and others provide ready-made bouquets.

Colorful leaves such as maple, oak and beech may be allowed to dry naturally, or preserved with glycerine.



Prunings from wisteria or grapevines can easily be fashioned into handsome wreaths with a little hand-shaping while they are still pliable. In addition to or instead of those, try making wreaths with long flexible shoots of willow, bayberry, fragrant sumac, shrub dogwoods (especially those with red and yellow bark) and others.

Burs (beech), cones (pine, spruce, hemlock, alder), nuts, seed pods (sycamore, golden rain, magnolia) and spurs (apple) may be saved for making wreaths, swags, plaques and various other creations.

Winter

Bringing in one's own greenery can be very satisfying to the home gardener, and not just at holiday time.

Mixed evergreens can make an interesting winter bouquet that will last for months and provide special fragrance.

Branches from broadleaf evergreens such as holly, rhododendron, mountain laurel, magnolia, pieris, cherry laurel and leucothoe should have basal ends of woody stems crushed to aid water absorption, then be placed in buckets of water

and kept in a cool place until needed. Small clippings can be sprinkled with water, packed in plastic bags and kept under similar conditions.

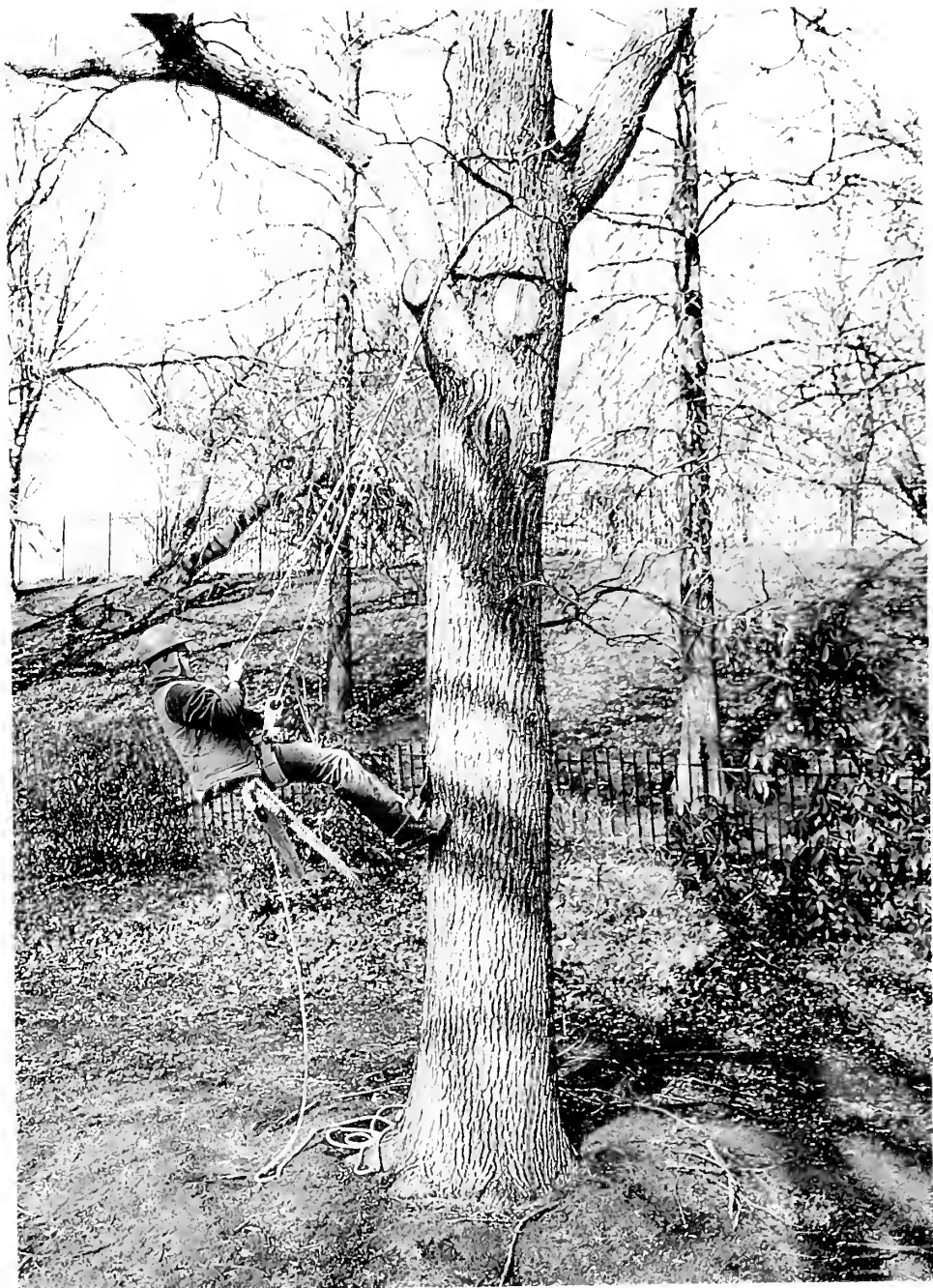
Needled evergreens such as fir, hemlock, spruce, pine and others are best clipped closer to the time of use. They, too, require cool, damp storage.

Prunings from ivy (vines or ground-covers) can provide year-round greenery indoors. Gather lots of ivy cuttings (preferably small-leaved) about three inches long and plant a wreath with them by sticking the cuttings into a wire wreath frame packed with moist sphagnum moss, wrapped with thin green plastic. Treated as a house plant, it will last for years.

Wreaths, door swags, kissing balls, roping (white pine shoots are ideal for ropes) and other Christmas decorations can be made in advance, sprinkled with water and stored in plastic bags in a cool, but not freezing, area.

Every time you get out your pruning shears, remember to look for decorative material before you cut. The more you look, the more you will see.

Prune with a decorative eye. ♣



Winter pruning at Brooklyn Botanic Garden.

PRUNING TOOLS

ALAN D. COOK

Pruning tools, like the tools of any craft or profession, must be:

- ❶ suited to the task; e.g. it is difficult to shear a hedge with a saw;
- ❷ of sufficient capacity for the task at hand; e.g. pruning shears made for one hand cannot cut through limbs that two-hand loppers can; and
- ❸ clean, sharp and in good operating order; e.g. a rusty saw with a bent blade is hard to use and makes poor pruning cuts.

What kind of shears to use for various branch sizes (see below) depends somewhat on the species and the condition of the wood. For example, pin oak branches are harder to cut than linden. Dead wood, until decay sets in, is tougher than live wood.

Pruning Shears for One Hand

Various sizes and models of hand pruners are available, in a wide range of prices. The amount of pruning you expect to do will help determine type and quality of pruning shears to buy.

Hand pruning shears are good for branches up to 3/4 inch in diameter if you have a hand that can make a person cringe during a handshake. If you're the person who cringes, hand shears will get you through 1/2-inch branches. Unless your shears are topnotch and heavy duty, attempting to cut larger branches can

ruin them, and strain you.

There are two kinds of hand shears, determined by the way they cut: 1) the snap cut, also called the anvil cut, and 2) the draw cut, also called the scissors action and bypass type. In the first style, a sharpened blade cuts against a broad, grooved blade. In the second, a thin, sharp blade slides closely past a thicker but also sharp blade.

The latter usually costs more, but makes cleaner, closer cuts and is preferred by most serious pruners.

Models are available with swiveling handles to reduce fatigue, and there is at least one model for left-handed persons.

For hands of limited strength due to arthritis, age, youth or other reasons, there is a lightweight ratchet-action hand pruner on the market. It is of the anvil cut persuasion, not the best. But it makes reasonable pruning cuts in short, easy steps. It won't make big tough cuts, and the mechanism that holds the blades shut usually breaks sooner or later. Even so, this tool is a boon to many of us.

With hand pruners, there's a danger of the literal manifestation. Keep fingers away so the hand pruners prune limbs, not hands. Any victim will testify that at the last instant one will realize some skin is in the wrong place, but one cannot stop in time. Be careful.

A belt-mounted sheath helps keep

hand pruners handy.

If your pruning shears have a detachable spring between the handles (for returning handles to open, ready-to-cut position after each cut) it is wise to keep an extra spring (order from your dealer) on hand. Such a spring will break eventually, and springless pruners are tedious to use.

Lopping Shears for Two Hands

Lopping shears, usually just called loppers, are available with two handles ranging from 16 inches long or less to huge models with three-foot handles. Other things being equal, the longer the handles, the bigger the branches loppers can cut. Small loppers may do no better than sturdy one-hand pruners, 1/2 to 3/4 inch. Big ones can handle limbs two inches or more in diameter.

As with one-hand shears, loppers come in either snap cut or draw cut style. Ratchet-action loppers are also available, and some models feature mechanisms for increased leverage.

With loppers, the larger the cut, the harder it is to do a clean job without tearing bark that should be left intact.

Pruning Knife

Pruning knives have heavy, hooked blades. In the hands of an oldtime gardener or nurseryman, a pruning knife is a precision instrument, swift and beautiful. In the clutches of an average suburbanite, however, such a knife has a diabolical will of its own, apt to be dangerous to both the plant and the operator. Unless you're already a skilled practitioner, forget the pruning knife.

Hedge Shears

Manual hedge shears have long, flat blades and relatively short handles, one for each hand. If you intend to do a lot on hedges or other formal work, get a pair with a shock absorbing device to

minimize an aggravation that could be called "pruner's wrist." Heavy duty hedge shears with one serrated blade are best for difficult jobs.

Pruning Saws

There are scores of makes and kinds of pruning saws. Fineness of cutting edge is measured in points (teeth per inch). An eight-point saw is for delicate, close work on small shrubs and young trees. Average saws are about 5-1/2 to 6 points, while 4-1/2 point saws are for fairly heavy limbs.

A rash of new saw designs, mostly from Japan, are on the market. Some have clever triple-edged teeth; some have two opposing rows of teeth. These cut relatively small branches rapidly and well.

One disadvantage is the lack of self-cleaning ability when used on resinous plants, such as conifers. Also, most have thin, somewhat brittle blades. If used with careless energy, blades may snap.

At least one U.S. company is said to be working on stronger blades with fast-cutting teeth.

Handles are important to those with small or not-strong hands. Many saws have a slightly curved handle that fits no normal hand and requires a lumberjack's grip. Pistol grips and "D" grips are easier to handle.

Curved blade or straight? Many prefer a curved blade that cuts on the draw stroke, especially for light to moderate pruning. Some straight blade saws, especially for heavy work, cut on the push stroke.

A double-edge saw has fine teeth on one edge of the blade, coarse on the other. And whoever invented the double-edged saw should have to use one in a densely branched small tree. Can't you guess what the upper edge is likely to do to an upper branch while you're cutting a lower branch?

Bow saws are good only where no

obstruction exists for a foot or more above the area to be cut.

Pole Pruning Tools

Pole-mounted pruners are operated either by a lever that is squeezed or by a lanyard that is pulled. Some employ snap cut and others draw cut mechanisms, as discussed above.

Pole pruning tools are available with wood, metal or synthetic poles. Often they have three six-foot sections that fit together to create a six-, twelve- or eighteen-foot pole. Telescoping poles are also available, too.

Wooden poles are heaviest. Metal poles conduct electricity dangerously well (as from overhead utility wires not noticed until too late). Fiberglass and other plastic poles are light-weight and don't conduct electricity. Of course, even a nonconductive pole or lanyard will entertain a charge of electricity if it is wet.

Never use a pole or other pruning device within ten feet of wires, even if they are "only" low-voltage telephone lines. Unfunny things can happen.

The higher the limb to be pruned, the harder it is to make the cut in proper location and angle.

Poles also can be fitted with pruning saws. But unless the limb to be cut is strong and firmly affixed, the saw bounces with sawing strokes in a frustrating manner.

If the limb is strong and firmly attached, sawing with a pole is easier. But such a limb is likely to be heavy, and dangerous to the pruner standing below. Often the pruning person's best hope is that said limb, after severance, will lodge tenaciously and temporarily safely among remaining branches.

And a saw produces sawdust, which won't put a lump on one's head, but will irritate one's eyes.

However, using a pruning saw is safer than pruning from a ladder, or from

atop a small box balanced atop a larger box. Please, prune only when both feet are planted firmly on firm ground.

Pruning Rope

There is a device consisting of a light rope (lanyard) with a flexible section of cutting teeth in the middle. One end of the rope is tossed over an overhead branch and the ends of the rope pulled resolutely back and forth to operate the cutting section.

The above remarks about pole saw safety apply here, too.

Power Pruning Tools

Various pruning tools are powered by electric, gasoline or pneumatic motors.

Usefulness of electric tools is limited by the length of allowable extension cords. Smaller motors must employ shorter cords to avoid excessive voltage drop.

Also, remember that powered cutting tools will sever whatever they are applied to, and electric pruners have been known to cut the cords that feed them.

Gasoline-powered tools are not limited by bothersome cords, but they are noisier, smokier and usually heavier and harder to start than electric units.

Pneumatics run by compressed air and are seldom suitable for amateurs.

Always wear sturdy work shoes and snugly-fitting clothing, including gloves, when operating power tools. Never use electric tools when foliage is wet, including grass underfoot.

Power hedge trimmers are okay, if used with care, for light formal shearing of hedges and topiary figures. They are faster than hand-operated hedge shears, but don't necessarily do as good a job.

Power-driven chain saws, mostly gasoline fueled, dot suburban and even urban landscapes. And persons injured by power saws dot emergency rooms across the land. Most of us should call profes-

sionals for work requiring chain saws.

When you disregard that advice and proceed to prune with a chain saw, at least keep both feet on the ground, and cut nothing higher than your waist. Repeat: Most of us should call professionals for work requiring chain saws.

If you use power for pruning, by all means purchase or rent models that require two hands for operation (will shut off if either hand is removed from controls).

Care of Tools

Keep cutting edges sharp. Sharpen cutting edges of drawcut pruners and loppers on the outside edge only, so inside surfaces sliding against one another are left flat. Sharpen cutting edges of snap cut pruners on both sides.


Some handy persons can deftly file edges of saw teeth, but the average person should take saws to a professional sharpener.

Clean tools after each use, or during use on resinous wood. Apply a thin coat of light oil (some use baby oil) on metal surfaces, and oil pivot joints before storing between jobs.

Follow manufacturers' maintenance advice on power tools.

Use tools respectfully. Don't twist or strain pruners or loppers. Long, firm strokes with a saw will cut faster, but if one is too eager the saw tip may wedge in the kerf on a too-rapid push stroke, bending the blade. Or breaking it.

A bent saw is an abomination. Straighten it? Maybe. More likely you'll get two bends instead of one.

Treat wooden handles with linseed oil once a month to preclude splits that punish hands. Or, better, paint handles — wood and metal — bright yellow or orange so you can spot them easily when they try to hide in the grass. 

WHERE TO GET PRUNING TOOLS

AMERICAN STANDARD CO.

P.O. Box 325
Plantsville, CT 06479

AMES LAWN AND GARDEN TOOLS

P.O. Box 1774
Parkersburg, WV 26102

ARBORIST SUPPLY HOUSE

P.O. Box 23607
Ft. Lauderdale, FL 33307

CLAPPER'S

1125 Washington St.
W. Newton, MA 02165

GARDENER'S SUPPLY CO.

128 Intervale Rd.
Burlington, VT 0541-2804

A.M. LEONARD INC.

6665 Spiker Rd.
Piqua, OH 45356

MACKENZIE NURSERY SUPPLY

P.O. Box 322
Perry, OH 44081

MELLINGERS INC.

2310 W. South Range
North Lima, OH 44452-9731

WALTER F. NICKE

Box 433, McCleod Lane
Topsfield, MA 01983

PRUNING GLOSSARY

Arborist — A specialist in planting and transplanting, pruning and diagnosing the ailments of trees and in tree surgery and maintenance.

Branch bark ridge — The darker ridge of bark which forms above the intersection of trunk and branch (see drawing on page 12).

Branch collar — The bulge of growth on the trunk at the base of a branch (see illustration, page 12).

Broodleaf evergreen — An evergreen with wide, flat leaves, such as rhododendron or holly.

Candle — New terminal growth on a pine, from which needles will emerge.

Crotch — The angle formed by a main and secondary branch or by a branch and the trunk.

Deadheading — Removal of flower heads past their prime.

Dehorning — A drastic pruning technique that entails removal of large branches, especially high in the crown. See *Topping*.

Disbudding — Selective removal of flower buds so that the remaining buds receive more of the plant's energy and thus grow larger.

Espalier — A tree or shrub trained in a pattern against a wall or trellis.

Hatracking — Poor tree-pruning technique which usually results in overly long dead ends or stubs.

Heading back — Pruning to shorten branches, often to reduce the size of a tree or shrub.

Lateral branch — A branch attached to and subordinate to another branch or a trunk.

Leader — A trunk or stem extending up through the main axis of a tree or shrub and clearly emerging at the top.

Pinching — Shortening shoots, usually by using one's fingers, to create a bushier, more compact plant.

Pleaching — Intertwining branches of trees or shrubs to form an arbor.

Pollarding — Severe pruning of the main branches of a tree each year to produce a thick growth of young branches.

Scaffold limbs — The principal branches growing from the trunk or other main branch to form the framework of a tree or large shrub.

Stubbing off — See *Hattracking*.

Sucker — A shoot or stem that origi-

nates from the roots or trunk beneath or near the ground.

Thinning — Removing entire branches to create a more open plant. This type of pruning accentuates a plant's natural character.

Topping — Indiscriminate cutting off of the tops of large limbs or the trunk of a tree, which results in a stressed, weakened tree.

Watersprouts — Rapidly growing, soft shoots that commonly appear after heavy pruning. They are rarely strongly attached branches and should be removed unless they fill a hole in the tree's framework.

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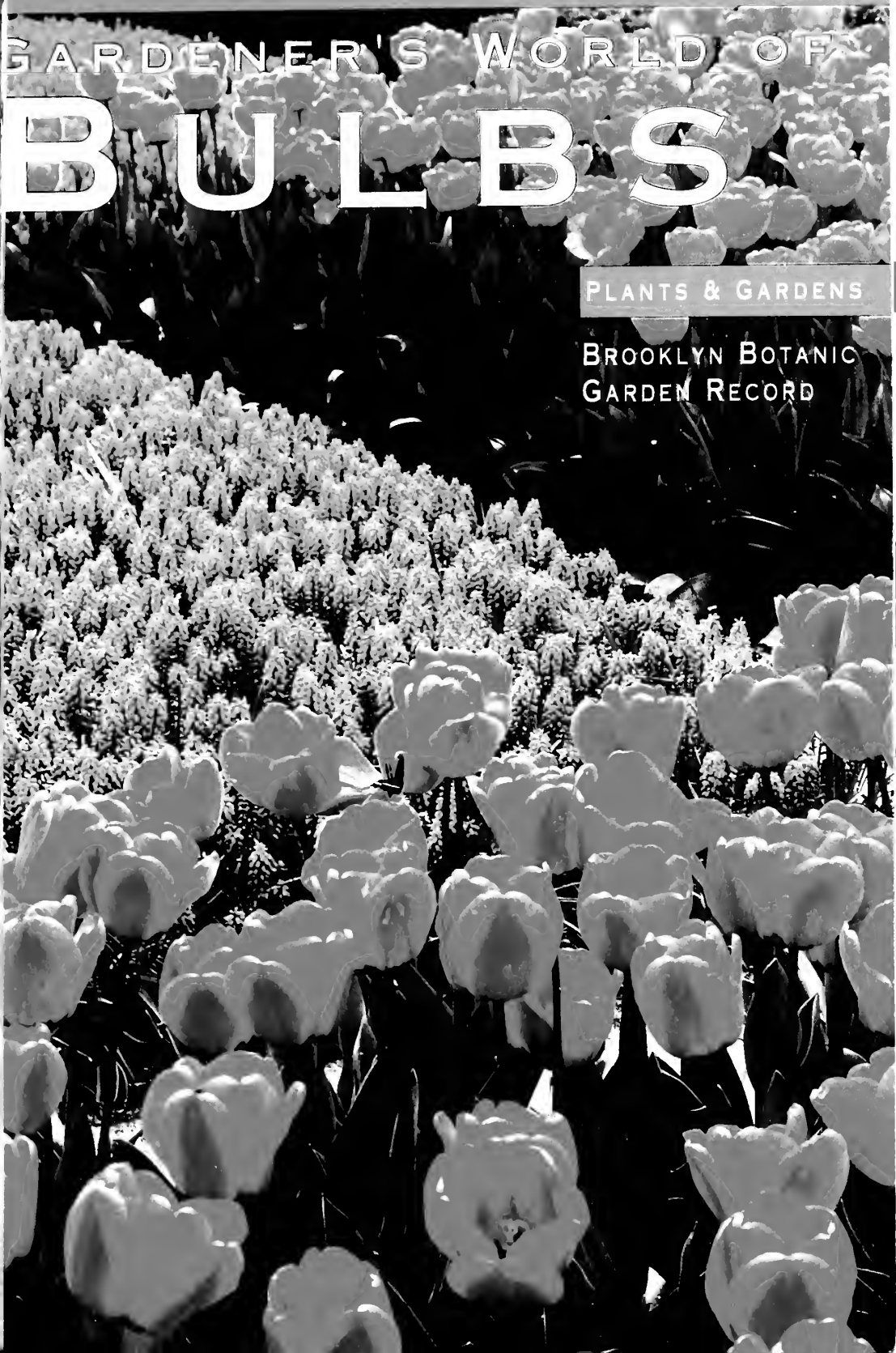


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GARDENER'S WORLD OF BULBS

PLANTS & GARDENS

BROOKLYN BOTANIC
GARDEN RECORD

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BULBS

1991





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GARDENER'S WORLD OF BULBS

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JOANNE PAVIA

FOREWORD

Store displays of bulbs in autumn or spring give little hint of the peacock array of flowers waiting to delight us. Concealed beneath their plain brown wrappers, bulbs are almost magical, rarely failing to awaken the childlike sense of wonder in even the most experienced gardener.

Bulbs are a fascinating category of perennial plants. Their lumpy underground structure is designed to get them through hard times, whether winter cold or summer drought. It also makes them relatively easy to ship to market and plant in the garden. And what a diverse category of plants: There are bulbs for shady woodlands and sunny open areas, regions with mild winters and those with cold ones, locations with limited rainfall

and others where precipitation is more abundant. Not all bulbs are winter hardy, or able to flower where winters are warm. But that doesn't stop dedicated gardeners, as many bulbs can be stored over harsh winters, refrigerated or grown in containers.

Bulbs are appropriate for the most formal herbaceous border or the most casual naturalistic garden. They can be massed for display in a public or private garden, or a small number can be used to enhance a mixed planting of perennials or native plants. They enchant us as the first flowers of spring, enlarge the sumptuous splendors of summer, provide the last blooms of autumn. There is a bulb for anyone who enjoys the pleasures of the garden, wherever the garden.

JUDY GLATTSTEIN

GUEST EDITOR

THE BOTANY OF BULBS

BY MOBEE WEINSTEIN

Definitions

Many people are familiar with tulips, daffodils and other bulbous plants. But what, exactly, are bulbs? Horticulturally speaking, the term "bulb" is often used loosely and refers not only to true bulbs but also to corms, tubers, rhizomes and tuberous roots. Although technically different, they all have one thing in common: They are highly specialized storage organs. Surviving adverse seasons of drought and/or extreme heat or cold underground, these food storage organs enable the plants to grow rapidly during favorable conditions.

Botanically speaking, a true bulb is a usually subterranean modified stem with leaves, complete with flowers in embryonic form. This can be seen by slicing through the bulb vertically. Bulbs consist of a basal plate from which the roots will grow and a thick, shortened stem surrounded by fleshy scale leaves. These scales contain the food necessary to sustain the bulb during dormancy and early growth. The basal plate also serves to hold these scales together. There are two types of bulbs:

tunicate and imbricate (sometimes referred to as scaly.) Tunicate bulbs have scales which are tightly wrapped around the bud and covered in a thin, dry papery skin called a tunic. *Tulipa*, *Narcissus* and *Hyacinthus* are examples. Imbricate bulbs have thick scales which are loosely arranged and may have no covering. An example is *Lilium*, the true lily.

During the growing season, small new bulbs, called bulblets, are produced from lateral buds on the basal plate. Some types, such as lilies, can also produce small bulbs, called bulbils, above ground in the axils of their leaves.

A corm is a modified stem also usually subterranean. The base of the stem becomes swollen and forms a solid mass of storage tissue. Like the true bulb, it has a basal plate from which the roots will grow. The corm has no fleshy scales, but is covered by dried leaf bases that resemble the tunic seen in many true bulbs. On the top of the corm you will find one or more growing points, or "eyes," from which the top growth will come. During the growing cycle, the corm is depleted of food reserves and is replaced by a new corm formed from buds on top of or beside the old one. In addition, some form small new corms,

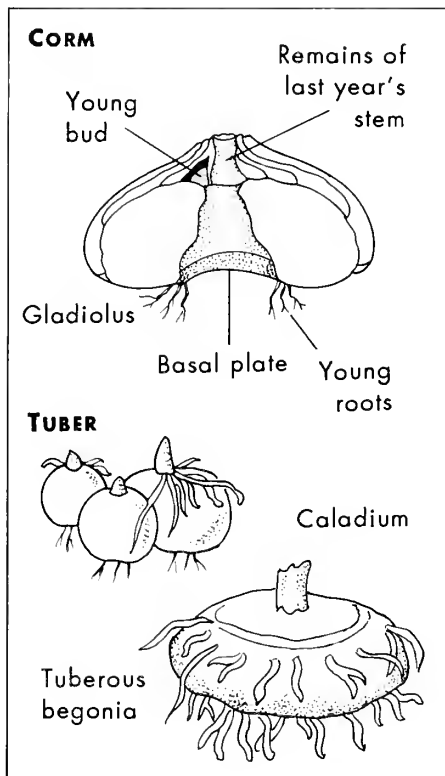
MOBEE WEINSTEIN is Assistant Foreman of Gardeners at New York Botanical Garden.

called cormels or cormlets, around the basal plate. *Crocus*, *Gladiolus* and *Freesia* are all examples of corms.

Like the corm, a tuber is a modified stem which is usually subterranean. However, that is where the similarity ends. Tubers have no basal plate, nor do they have a tuniclike covering. They are usually swollen with food reserves and have growth buds, or eyes, scattered over the surface. Both roots and shoots emerge from these eyes. Some tubers, such as the potato and *Caladium*, diminish in size during the growing season, but produce new tubers from the buds of the original one. Others, like the tuberous begonia, gloxinia and *Cyclamen*, increase in size as they store food and produce new growth buds for the next season.

In addition to tubers and corms, rhizomes are modified stems too. Sometimes referred to as a rootstock, a rhizome is a thickened stem growing horizontally, usually below the soil surface. Roots grow from the lower surface, while shoots will develop from buds or eyes on the upper surface or sides, usually at the tip. *Canna*, certain types of *Iris* and the calla lily are all rhizomatous. Some plants like the lily-of-the-valley will send up detachable "pips" which are small, upright shoots with their own roots.

Different from all the others, tuberous roots are formed from root tissue. These swollen roots are modified specifically to store food. During the growing season, other fibrous roots are responsible for the uptake of water and nutrients. Occasionally, the growth buds, or eyes, are scattered over its surface, as in the sweet potato, but in most cases, these buds are restricted to that part of the old stem which joins with the tuberous root. This area is often called the crown. The *Dahlia* is an



example of this type of storage organ.

From here on, I will use the term "bulb" in its broad sense, to include all five types of storage organs just described.

Distribution

Bulbs enjoy, for the most part, a worldwide distribution. Most regions of the world, with their varying environments and climates, offer representatives of this large and diverse group of plants.

The majority of our winter-hardy bulbs that can survive cold temperatures come from the Mediterranean region. This climate is characterized by cool, wet winters and hot, dry summers, often with a short

spring season. Although four other areas of the world have this type of climate, portions of California in North America, southern Chile in South America, the southern tip of Africa and the southern and western parts of Australia, they are not responsible for providing us with many hardy bulbs. A few very popular examples from the Mediterranean region are *Narcissus*, *Crocus*, *Muscari* and *Hyacinthus*. A number of other winter-hardy bulbs come from Asia and North America where the climate is considered temperate, having warm summers and cold winters. The highly favored *Tulipa*, many species of *Lilium*, and *Lycoris* all come from parts of Asia, while North America provides other species of *Lilium*, some species of *Fritillaria* and *Anemone*, as well as *Iris cristata*.

Although South Africa does not give us hardy bulbs, it is very rich in subtropical ones. These plants prefer cool growing conditions, but cannot tolerate freezing temperatures. As they are from the southern hemisphere, their seasons are opposite ours, and most of them are active in our fall and winter. Many garden favorites originate here: *Gladiolus*, *Freesia*, *Amaryllis*, *Clivia*, *Nerine* and *Agapanthus*, to name a few.

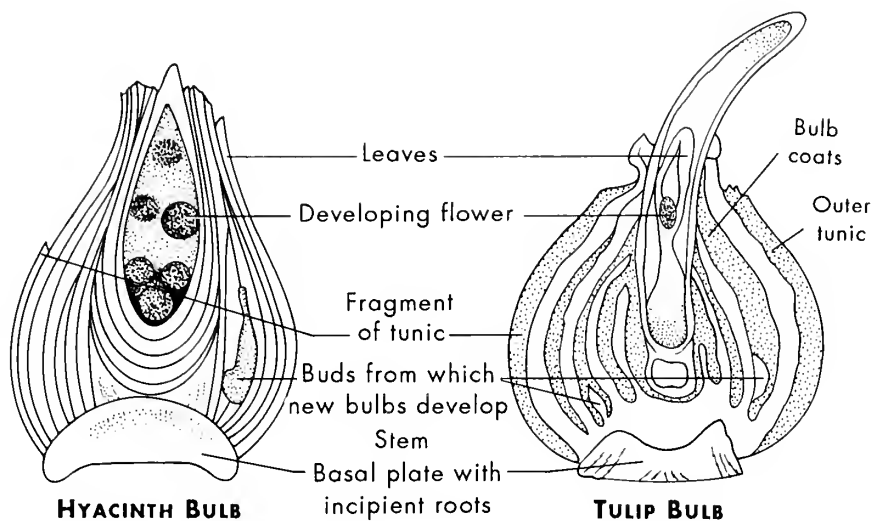
Geographically, the tropical zone reaches from the equator north to the Tropic of Cancer and south to the Tropic of Capricorn. Here, day length is consistent throughout the year. Outside of day length, these areas are not all similar. Due to other factors, such as the presence of bodies of water, ocean currents, the presence of mountains and their orientation and elevation, and atmospheric currents, the climatic zones do not follow precisely the geographic lines, nor do all the areas that fall within this belt share the same climatic conditions. Some regions of the tropics, in particular the tropical rain forests, have

great amounts of annual precipitation which is evenly distributed throughout the year, as well as relatively warm, constant temperatures. Here, life is richest as the factors controlling growth are not limited. Other tropical areas may have seasonal dry periods, and still others experience very limited rainfall in conjunction with extreme temperatures and often tremendous daily fluctuations. As in other parts of the world, there are also zonal changes as you ascend mountains and the altitude increases. From the vast tropics of Africa, Asia and South America come many "bulbous" plants. *Alstroemeria*, *Dahlia*, *Caladium* and tuberous begonias all hail from South America. All species of *Alocasia* and *Colocasia* come from tropical Asia, while different species of *Crinum* come from all three regions. *Gloriosa* and *Acidanthera* come from tropical Africa.

Taxonomy and Nomenclature

As the horticultural and botanical definitions of the word bulb are different, so too are there differences between horticultural "families" of plants and botanical ones. Horticultural "families" are often based on certain gross similarities such as cultural requirements or their habit of growth — for example bulbs, vines or succulents. As with the term bulb, the horticultural usage is of a broader, more general scope than the botanical one.

Taxonomy is the science of classifying things into various categories or groups. Here we are concerned with the classification of plants. The first and largest category is called the kingdom and the subordinate categories become increasingly more specific in defining the boundaries of their members. More than one system of classification exists reflecting various differences in opinion. The characters that form the basis of distinction are diverse but usually



are combinations of morphological features, particularly reproductive structures such as flowers and fruit. For our purposes, we will only concern ourselves with the category of the family and its subordinate groups. A family is composed of plants sharing certain characteristics but differing in others. It is further broken down into units known as genera, which in turn are separated into one or more species.

All plants are given botanical names composed of two parts according to the binomial system which was applied by Carolus Linnaeus, the founder of modern plant classification. The first part is called the genus (plural genera) and the second is referred to as the specific epithet. A species is referred to using both the genus and species epithet.

Botanical names are governed by the rules set forth by the International Code of Botanical Nomenclature. The genus is always written with a capital first letter. Both genus and species are italicized.

All in all, there are approximately three thousand species of bulbs in existence today and it is interesting to note that the majority of them come from only three families: the amaryllis family (Amaryllidaceae), the iris family (Iridaceae) and the lily family (Liliaceae).

This should serve as an introduction to the world of bulbs. A better understanding of the various types of storage organs and their growth patterns, as well as the varying conditions in which they grow, will help you cultivate these fascinating plants successfully.

THE HISTORY OF THE TULIP

BY CARLA TEUNE

In 1561 Conrad Gesner made an engraving of a tulip for the book of a friend, Valerius Cordus. The famous *Dodonaeus* (1568) included a picture of a tulip. However, it was Carolus Clusius (Charles d'Ecluse, born in 1526 in Utrecht) who received some bulbs (or possibly seeds) from Constantinople from his friend the Ambassador De Busbecq during a visit to Prague. In October 1593 Clusius became director (*Horti Praefectus*) of the Leiden University Hortus Medicus, which was planted under his supervision in 1594. We are more or less certain that Clusius grew in the Leiden Hortus a red and yellow tulip 'Zomerschoon' (Summer Beauty) in the spring of 1595. Although Clusius wasn't willing to part with these extremely rare beauties (he kept them in a special, enclosed part of the garden devoted to scientific research), unannounced "visitors" climbed over the rather low fence and stole some of the precious bulbs.

The tulip was so rare that only very rich noblemen and people in high government office in the two provinces of Holland could afford to buy the bulbs

in those first years. It wasn't until the early 17th century that Amsterdam merchants established the tulip trade, and even then, prices soared sky high. Records show that the variety 'Semper Augustus' (with white and red flamed or broken flowers) was sold in 1623 at the astounding price of 1000 Dutch guilders *for one bulb*. Two years later, two bulbs of the same variety fetched an offer of 3000 Dutch guilders; as this was considered far too low, the offer was rejected.

Fashion and status also kept prices high. For instance, among the High Society in Paris it became the height of fashion to adorn low-cut ladies' dresses with fresh-cut tulips. Tulips became the supreme status symbol as women vied for the rarest — and most expensive — tulips to display on their bosoms.

"Tulipomania," as we now call this period, began around 1634. According to an invoice, one bulb of the tulip 'Viceroy' was sold for:

2 cartloads of wheat
4 cartloads of rye
4 fat oxen
5 pigs
4 tubs of ale

CARLA TEUNE is curator of the University Botanic Garden, Leiden, the Netherlands.

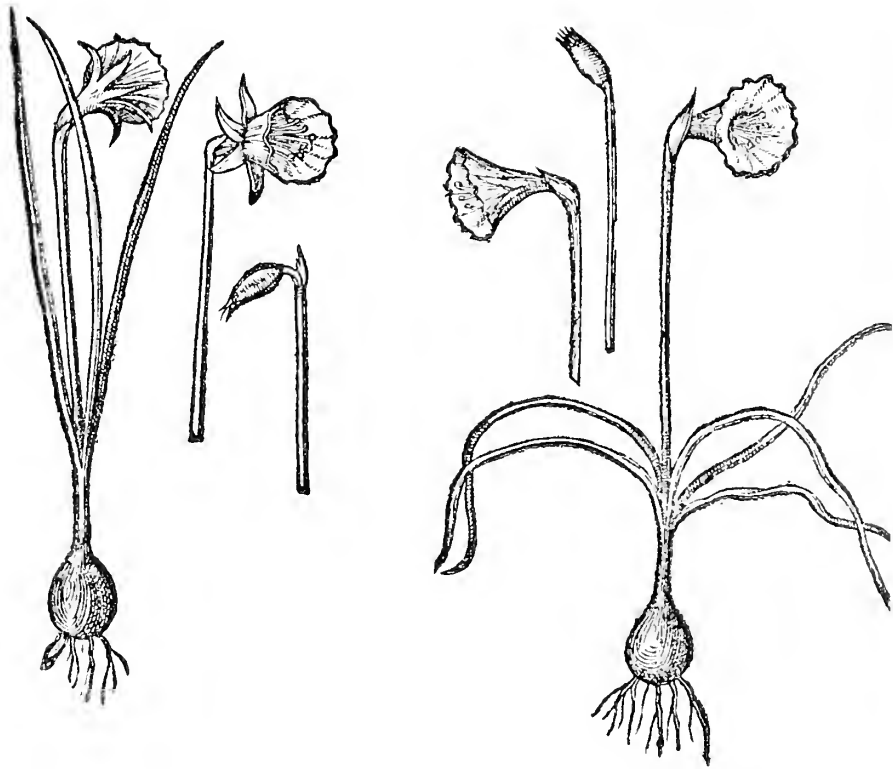


Frontispiece from Carolus Clusius' *Rariorum Plantarum Historia*, 1601.

2 hogshead of wine
 2 tubs of butter
 a thousand pounds of cheese
 one bed
 some clothes
 a silver beaker

All this was worth a total of about 2500 Dutch guilders, plus 500 more for a ship to transport it.

The most beloved tulips were the flamed, striped or broken varieties. In those days, people didn't understand how



An early-17th century illustration of *Narcissus bulbocodium*, a name provided the hoop-petticoat daffodil by Linnaeus.

these broken flowers were possible. Today, of course, we know that they are the result of a virus easily transmitted from one plant to another by insects.

The tulips of the 1630s were rarely paid for in currency, but rather with certificates that promised a great deal but in reality were worthless — like some “junk bonds” today. Even the certificates themselves were traded. Inevitably, this rampant speculation ended in a big crash, which took place at an auction on the 3rd of February, 1637. It was the beginning of the end of tulipomania. The government of the two provinces of Holland took strict measures to prevent this kind of speculation from ever happening again. Many people were

financially ruined and forced to find new employment and start a new life. Only the innkeepers at whose establishments tulip speculators had gathered and traded made out well in the end.

The tulip Clusius received from Constantinople was not a wild species tulip but rather a cultivated plant. (Europe has its own wild tulips — *Tulipa sylvestris* and *T. grengiolensis*, for example. Tulips are also native to the area from Asia Minor and Iran through Asiatic Russia and western China.) Even in Turkey in those days a beautiful tulip fetched a good price. During the Ottoman Empire under Sultan Suleiman I (1494-1566) the tulip was a favorite flower. But it reached its pinnacle of popularity



Tulipa serotina distinguished as *minor*, left, and *major*, right, in the 17th century.

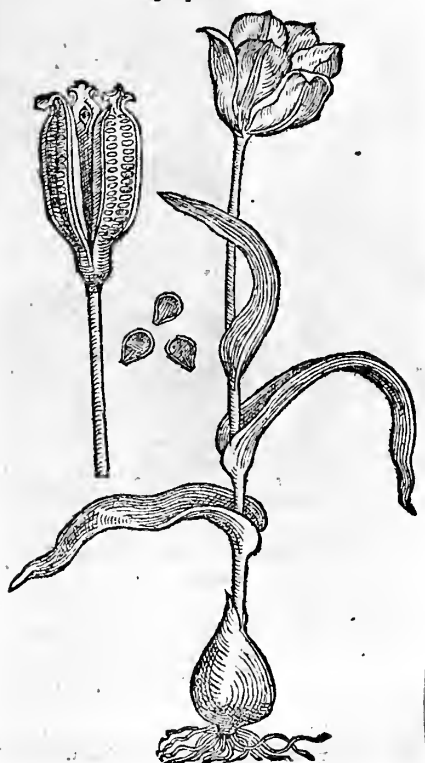
under Sultan Ahmed III (1703-1730). He even imported tulips from Holland — he was curious to see what these foreigners had done with his beloved flower for the past 150 years. During this period, it was forbidden to take tulips out of Constantinople. Punishment was severe, and foreign visitors were warned that a man's life was far less valuable than a beautiful tulip. No wonder that in Constantinople this period is known as the Tulip Century!

The Turks kept a very strict register in which all existing and new tulips were described — over 1588 names are mentioned in this book, called *Ferahengiz*. In those days, the perfect flower was considered one which had petals in the shape of a

needle or dagger. The petals had to touch, the three inner petals had to be smaller than the three on the outside and they had to cover the anthers and pistil entirely. What's more, the flower had to stand upright. All other flowers were considered worthless.

Although tulipomania ended in disaster for many people, it obviously was not the end of tulip cultivation in Holland. For a long time tulips (and other bulbs like hyacinths, daffodils, crocus and crown imperials) were grown primarily in the region between Leiden and Haarlem. The soil in this region was considered particularly good for bulb growing: light, sandy, well drained.

Tulipa præcox F.v.



Tulipa præcox.

Nowadays, this area is still very important and known as the "Bollenstreek" or bulb area, but bulb growers have moved on to other parts of the country as well: North of Haarlem, around the villages of Limmen and Anna Paulowna and Breezand and even in the newly made polders in the old Zuiderzee, daffodil bulbs are grown today.

In recent decades, the acreage devoted to bulb growing has grown dramatically. In 1960 10,000 hectares were cultivated with bulbs; in 1989, more than 16,000 hectares. On the other hand, the number of bulb firms has decreased precipitously. In 1960

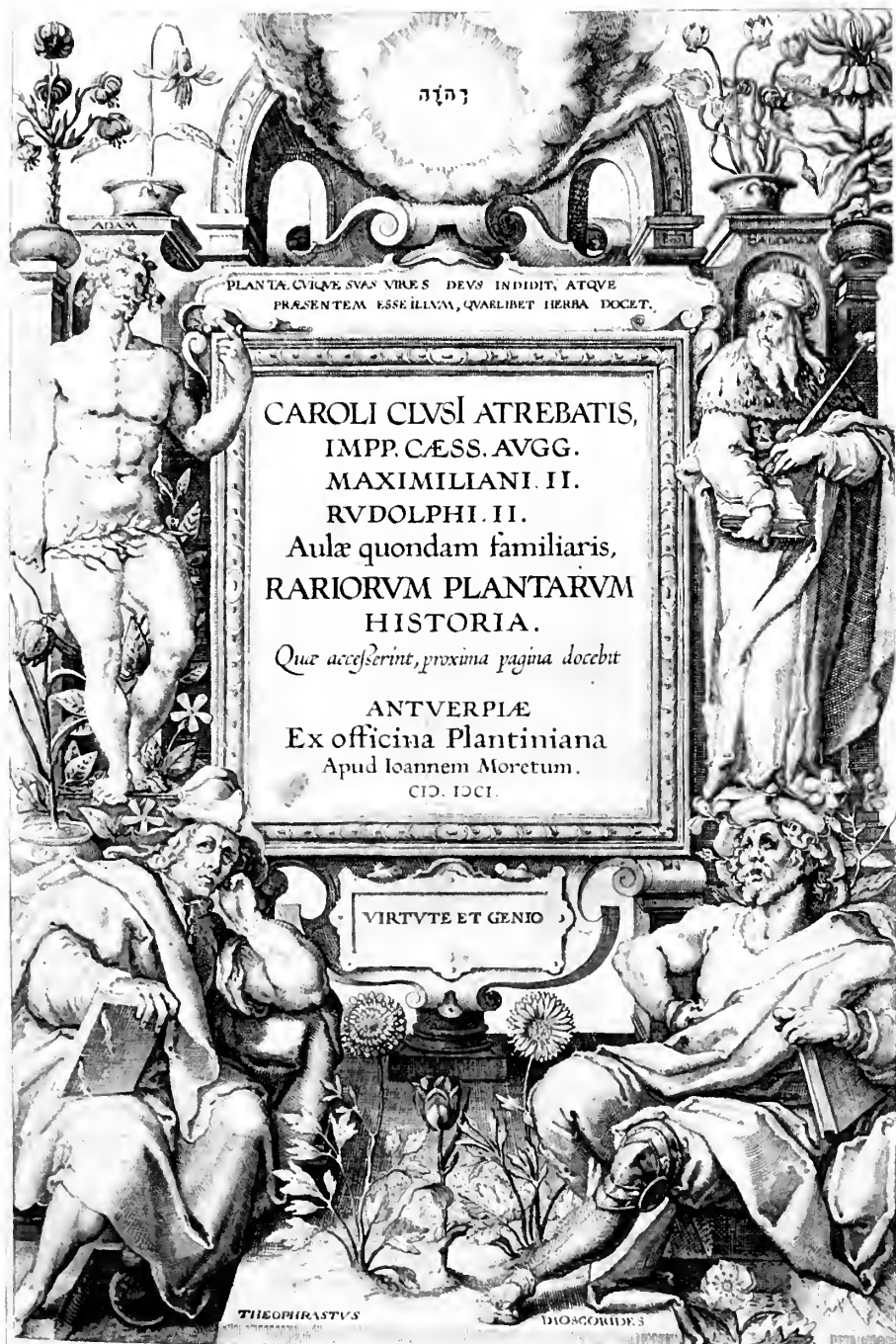
Holland had approximately 13,000 bulb-growing firms; this number had dropped to 4,000 by 1988.

At the end of the 17th century bulbs were already exported to several countries, but for a very long time prices were high, and bulbs remained status symbols. Today bulbs are exported to more than 100 countries. In March, 1849, one Mr. van der Schoot, who lived in the bulb village of Sassenheim, left Holland by boat to try his luck as a bulb exporter in the U.S. In 1987 the United States took second place in the long list of countries that import Dutch bulbs; only Germany imported more. In 1989 Holland exported 4.3 billion bulbs, and more tulips were exported than any other bulb. Bulb exports grew that year by 5 percent. Tulip exports grew by 6 percent after a decline in the mid-eighties.

Much attention is paid to maintaining the quality of bulbs for export. Research continues on virus-free bulbs, pest control (especially non-chemical controls) and new propagation methods.

For 130 years the Dutch Bulb Growers Association (Koninklijke Algemeene Vereeniging voor Bloembollencultuur) has looked after the interests of some 4200 members. The association publishes a weekly bulletin in which new developments are described and bulb shows are announced. Every Monday members can meet at the association's headquarters in Hillegom to exchange tips on cultivating bulbs and see results of scientific research. And there are always bulbs to be judged.

The Dutch Bulb Growers Association has branch offices in several countries, including one in New York City. Every year huge shipments of bulbs are presented to cities and countries abroad, so that people around the world can experience the delight of Dutch tulips. ✕



Title page from *Rariorum Plantarum Historia*.



Anemonella thalictroides.



PHOTOS BY AUTHOR

NATIVE AMERICAN BULBS FOR THE GARDEN

BY CHARLES COLSTON BURRELL

A prophet is seldom recognized in his or her native land. Nor, I am afraid, is a good bulb. In our quest for the unusual, we often overlook the obvious. The native flora of eastern North America contains a great diversity of easily cultivated garden-worthy plants. From woodlands, fields and prairies come a dozen showy genera that have a place in every garden. A little extra attention to soil and moisture conditions gains experienced gardeners a few extra species whose

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Claytonia.

beauty repays the extra effort ten-fold.

Many native spring-flowering bulbs are referred to as "spring ephemerals." Like traditional garden denizens such as crocus and narcissus, the plants use the energy stored within their bulbs to put on a quick spurt of growth in early spring. They flower, set seed and disappear before the forest canopy closes in, blocking the sunlight for the remainder of the season. Once they're dormant, the soil in which they grow can be allowed to become quite dry without detrimental effects, although moisture is preferable.

Summer-flowering species, and certain of the non-ephemeral spring bloomers, require even moisture throughout the growing season. The later blooming species invariably require some direct sunlight and many will thrive in full sun.

Alliums (wild onions) are excellent summer-blooming bulbs for full to partial sun. Their starry six-petaled flowers are borne in rounded clusters atop slender stems. *Allium cernuum*, the nodding onion, is a large plant to two feet with flattened, gray-green foliage and dense umbels of white, pink or rose flowers that open from nodding buds. *Allium stellatum*, starry onion, a

prairie native, is more delicate, with smaller umbels of rose-pink flowers on one-foot stalks. *Allium tricoccum*, wild leek, prefers open woods and blooms after the showy spring leaves have disappeared. The cream to greenish flowers are often overlooked in the shaded summer woodland. Alliums are best propagated from seed or by dividing the tightly packed bulbs in spring or fall.

Anemonella (Thalictrum) thalictroides, rue anemone, is a dainty woodland denizen with airy foliage and white to rose flowers that seem too large to be supported by their four-to-nine-inch threadlike stems. The plant blooms tirelessly throughout the spring and disappears altogether by mid-summer. The delicate tuberous roots are easily divided in summer or fall, or you can sow fresh seed in outdoor beds.

The genus *Arisaema* contains two species that are of interest to gardeners for their attractive foliage and intriguing floral structures. The petals are replaced by a fleshy hood called a spathe, similar to that of a calla lily, which surrounds a central reproductive column called a spadix. *Arisaema triphyllum*, jack-in-the-pulpit, has single or paired leaves with three broad



Camassia scilloides.

leaflets borne on a fleshy stalk to three feet. The showy green spathe, produced in April and May, is striped with purple, brown or light green. *Arisaema dracontium*, green dragon, has a single leaf with seven to fifteen leaflets arranged in a semi-circle around the central stalk. The long, awl-like spadix protrudes majestically from an inconspicuous green spathe. Mature plants may reach four feet in height with a two-foot spread. Jack-in-the-pulpit requires moist, humus-rich soil in sun or deep shade. Green dragon needs moist to wet soil, will not tolerate drying out and prefers full to partial sun. Arisae-mas are excellent accent plants and the persistent foliage is useful in the summer garden. Both species have showy, orange-red fruits that should be cleaned from their pulp and sown outdoors when ripe or indoors with six weeks of cold, moist stratification. (Stratification is the practice of placing seeds between layers of moist sand or peat and exposing them to low temperatures. The treatment is necessary for seeds that require a period of chilling before they will germinate.). Tubers should be transplanted while dormant.

Amianthium muscaetoxicum, fly poison,

is a handsome native of acidic woodlands and savannas of the southeastern U.S. The bulb produces a mound of attractive strap-like foliage and a single two-foot flowering stalk bearing a dense, elongate cluster of creamy white flowers that fade to green. Somewhat finicky, the plants like humus-rich, sandy soil that is moist but well drained. Propagate by sowing seed outdoors when ripe or indoors with warm moist, then cold moist stratification. Bulbs can be divided when dormant.

Camassia scilloides, wild hyacinth, is a lovely denizen of low meadows and wet woods of the eastern U.S. The pale blue, starry flowers are produced in open, elongate clusters on one-to-two-foot stalks. Tricky to cultivate, the plant requires constant moisture, cool rich soil and full sun. In warmer areas, provide afternoon shade and a cool root run. Plants go dormant after flowering and can be allowed to dry out. Two western species with pale to vibrant blue flowers, *Camassia leichtlinii* and *C. quamash*, are of easy culture, but are not often grown outside their native ranges. Propagate by division when dormant. Seeds germinate readily with cold, moist stratification but require



Lilium superbum.



Allium stellatum.

many years to flower.

Claytonias, the spring beauties, are spring ephemerals that produce a wealth of foliage and flowers from small corms. The first leaves emerge in earliest spring, closely followed by the delicate white or pale rose-pink flowers. After four weeks of nonstop bloom, the plants disappear as quickly as they emerged. The plants make charming carpets among shrubs, in the lawn, or with other woodland plants. *C. virginica* has grass-like leaves while those of *C. caroliniana* are oval to broadly lanceolate. They thrive in moist, rich to average soil. Summer drought will not harm the dormant corms. Propagate by sowing fresh seed outdoors or by dividing the corm with a sharp knife after flowering.

Dentaria, also listed as *Cardamine*, is a genus of ephemeral woodland species that perform well in the spring shade garden. *Dentaria laciniata*, toothwort, has three



Lilium philadelphicum.



Lilium michiganense.



Lilium columbianum.

ragged, palmate leaves in a whorl below an open cluster of nodding pale pink flowers. *D. diphylla*, crinkleroot, has broad, thrice-divided basal leaves and six-to-eight-inch flowering stalks bearing paired leaves and flower clusters as above. Dentarias grow from brittle rhizomes that creep at or just below the surface in moist, loamy or humus-rich soils. Propagate by careful division of the dormant rhizome or by fresh seed sown outdoors.

Dicentras grow from fragile bulblet-bearing rootstocks. They are ephemeral woodland denizens that produce mounds of ferny foliage and nodding white flowers. *Dicentra cucullaria*, dutchman's breeches, bears a string of inverted pantaloons on eight-to-ten-inch stalks. The smaller squirrel corn, *D. canadensis*, has a cluster of heart-shaped flowers scented like hyacinths. These natives of rocky woods



Erythronium montanum.



Zephyranthes atamasco.

and riverbanks thrive in moist, humusy soil. They are dormant by June, so the soil can become quite dry with no ill effects. Use dicentras to accent taller plants such as bellworts and trilliums, or as a carpet with ferns that will fill in when the foliage disappears. Protection from rodents is advisable. Propagate by sowing fresh seed outdoors or by division of the bulblets.

The erythroniums or trout lilies are dainty spring wildflowers of exceptional beauty. They form large patches of brown-mottled foliage above which the open bell-shaped flowers nod on delicate stems. *Erythronium americanum* has yellow flowers while those of *E. albidum* are white with a blush of violet. They grow best in rich, moist woodland soil. Plants spread by underground stolons to form dense colonies that may get too thick to flower well. Several western species, including *Erythronium californicum* (creamy white), *E. grandiflorum* (yellow), *E. hendersonii* (purple) and *E. revolutum* (white to rose) are worth investigating. They do best in partial shade with cool, moist soil. Propagate from fresh seed or by dividing dormant clumps.

Fritillaria is a western genus that is seldom grown in the East. The most depend-

able species is *F. lanceolata*, mission bells, which has brown-purple rounded bells mottled with green. *F. biflora* (brown) and *F. pudica* (yellow) are also worth trying. They require rich, well-drained soil and should be protected from drying winds and hot afternoon sun. Plants should be left undisturbed once established.

Hymenocallis occidentalis, spider lily, and *Crinum americanum*, swamp lily, are two bulbs from the coastal Southeast that grow in low woods and pine savannas. The large bulbs produce mounds of coarse, linear foliage. In spring and summer a stout stem produces stunning white flowers that distinguish these two similar plants. Spider lily has thin straplike petals and a central saucer-shaped membrane that overlays the petals. Swamp lily flowers have six narrow, recurved to flat petals but lack the connecting membrane. Flowers of both are fragrant. Plant the bulbs in moist, rich, acid soil, in full sun or light shade. Propagate by separating offsets or dividing overgrown clumps while they are dormant. Fresh seed can be sown indoors or out.

Hypoxis hirsuta, gold stargrass, is a diminutive bulb that blooms all season. The narrow, grassy foliage seldom reaches



Erythronium americanum.

a foot in height and the flower stalk is usually much shorter. The three-quarter-inch yellow flowers are indeed starlike and are borne in loose clusters. Hypoxis grows in sandy, acid woodlands as well as on calcareous prairies. In the garden, give it moist, well-drained sandy soil. Propagation is best accomplished by dividing the corms during the fall or early spring.

The genus *Lilium* is well represented in the flora of the eastern and central states. *L. philadelphicum* is the most widespread, from the Great Plains to New England and South. Its scarlet to orange flowers are distinctive, upward-facing cups. *L. superbum*, *L. michauxii* and *L. michiganense* are similar to one another, with spotted, red-orange to orange flowers with strongly reflexed petals. *L. canadense* has yellow to red nodding bells. Native lilies require cool, rich soil with even moisture. They like their feet in the shade and their heads in the sun. *L. philadelphicum* prefers sandy acid soils and is more heat tolerant. Lilies have become increasingly rare in the wild and, like all native plants, should never be collected. Purchase only from reputable dealers known to propagate their stock, or grow your own from fresh seed sown outdoors.

Seed can be sown indoors by giving a warm moist, then a cold moist stratification before growing the seedlings on. They may take five or more years to flower. Scaling the bulbs is also effective (removing a few firm scales from the outside of the bulbs for propagation); young plants will flower in three years. They must be protected from rodents.

Stenanthium gramineum, feather-fleece, is a robust, late summer bloomer with a two-to-five-foot, airy cluster of creamy white flowers. The plants require rich, highly acid soils in full sun for best growth. The grasslike foliage is attractive from spring onward. Propagate by dividing the bulbs when dormant.

Trilliums are the most sought after of the bulbous natives and are all too often collected from the wild. Few dealers are propagating the plants they sell. Do not buy trilliums unless you are positive the plants are propagated. One or more stout stalks rise from what is actually a rhizome and bear three, broadly oval leaves in a whorl. The single flower has three showy petals and three conspicuous sepals. There are two groups, the stalked and the sessile trilliums. They differ in that sessile trilliums have



Fritillaria lanceolata.

mottled leaves and bear their flowers directly from the whorl of foliage while the others have erect or nodding stalks that hold the flowers. *Trillium grandiflorum* is the showiest, with large white petals that fade to rose. *T. erectum* varies from blood red to yellow and cream. *T. vaseyi* is similar with larger flowers. *T. stylosum* has slightly nodding, pale pink flowers, while *T. cernuum* and *T. flexipes* hide their white flowers below the foliage. *T. undulatum* is striking, with white petals dashed with crimson at their bases. The diminutive *T. nivale* is the first to bloom, often before the snow is melted. Of the sessile forms, *T. cuneatum* (maroon), *T. luteum* (yellow), *T. discolor* (pale yellow), and *T. recurvatum* (purple-brown) are recommended. Of the western species, *T. ovatum* (white) is the showiest. *T. chloropetalum* is a purple sessile type.

Trilliums thrive in evenly moist, humus-rich soils but are widely tolerant of condi-



Arisaema triphyllum.



Dicentra cucullaria.



Trillium nivale.



Trillium flexipes.

tions under cultivation. *T. nivale* must have near neutral soil and *T. undulatum* requires cool, highly acidic humus. Trilliums are easily propagated from fresh seed sown outdoors but may take up to seven years to bloom. The sessile species bloom in three to five years. Clumps can be divided when dormant and nicking the rhizome will produce offsets.

Zephyranthes atamasco, atamasco lily, is a small, spring-flowering bulb to one foot of wet open woods and pine savannas. The gorgeous four-inch white flowers open from slender buds as the straplike leaves are emerging. Atamasco requires moist to wet, sandy, acid soil in full sun. Plants languish in shade and never bloom. Propagate from seed sown fresh outdoors, or provide six weeks of cold moist stratification indoors. Divide the bulbs in the fall while dormant.



Dentaria laciniata.

BULBS FOR THE AUTUMN GARDEN

BY JUDY GLATTSTEIN

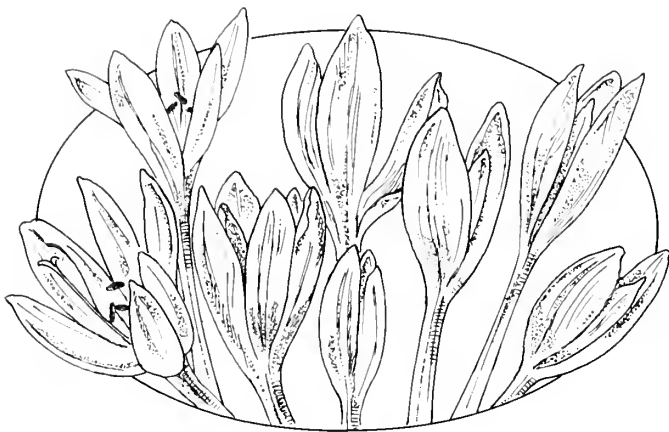
Most gardeners associate bulbs with the spring display provided by daffodils and tulips, crocus and snowdrops. Yet there are many other bulbs that flower at other times of year. It is especially rewarding to see new flowering in autumn, when most plants are going dormant. With autumn-flowering bulbs, planted in early autumn like spring-blooming bulbs, you need not wait months for flowers; a few weeks brings the gratification of bloom. Keep in mind, however, that because these bulbs will begin their growth right away, planting should be equally prompt; fall-blooming bulbs cannot sit around in brown paper bags until Thanksgiving, or even Halloween.

Some of these late-flowering species bloom "naked," unaccompanied by leaves. Thus it is a good idea to mark their location in some fashion, so that the spring flurry of clean-up and planting will not inadvertently disturb them. I have had great

success using a mat-forming groundcover of one kind or another as a "marker" — low-growing herbs such as *Thymus serpyllum* cultivars, for example. They have the added advantage of preventing autumn rains from splashing dirt onto the flowers and spoiling their appearance. And while in active growth in the summer, the groundcover will make use of moisture which the dormant bulbs do not need. What's more, I much prefer the look of plants in combination — especially in the instance of the autumn-blooming bulbs, most of which flower without leaves.

A major difficulty is obtaining the bulbs as early as August, as the books suggest. The earliest I have ever seen any of these in local nurseries, or received them by mail-order, is September. By this time many are showing pale, elongating shoots, fragile and susceptible to drying. Having chosen the planting location before I purchase the bulbs, I've cleared the first hurdle. Bulbs need more phosphorus and potassium than herbaceous plants, which do not have storage roots. I use muriate of potash and superphosphate, mixed into the bottom of

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Colchicum.

the planting hole. Since these are both chemical salts and can harm the basal plate, it is important that the granules are well mixed with soil, and a thin layer of unfertilized soil should be added to reduce likelihood of contact. If you suspect the fertility of your soil is low, use a liquid fertilizer in subsequent years. Apply the fertilizer when the leaves are green and growing, to supply immediately available nutrients to the bulbs during their relatively short period of above-ground growth. My favorite is Peter's Blossom Booster (10-30-20). Apply it half-strength when the leaves first appear, and twice more at three-week intervals. This is probably more important in the lean gritty soils of a rock garden than in the humus-rich soils of woodland gardens.

Planting depth is generally three times the height of the bulb, deeper in sandy soil. Heavy clay soils require more shallow planting; however, such soils are generally too wet for healthy bulb growth and it would be better to select a different site. After planting, water thoroughly. Replace any disturbed mulch, and wait. Flowering should commence shortly.

Most popular of the autumn-flowering bulbs are the *Colchicum* species. The gobletlike flowers appear in September and October. Once pollinated they swoon and loll seductively on the ground. Fresh flowers appear for a couple of weeks, extending the flowering period. They are easily distinguished from crocus as colchicum have six stamens; crocus only three. The flower color is generally a soft mauve-lilac, sometimes checkered, depending on the species. White forms are sometimes available, and *Colchicum autumnale plenum* and *C. speciosum* 'Waterlily' are double-flowered forms. Coarse, broad, bright green straplike foliage appears in the spring and persists until mid-June when it turns yellow and collapses all over its neighbors. Because of this untidy habit, colchicums are best grown with shrubs or comparably vigorous associates. While pollination occurs in the autumn, seed does not appear until late May; this habit gave rise to the old vernacular name of "son before the father." Some delightful selections include: *Colchicum autumnale*, daintier than the other species and thus suitable for



Colchicum speciosum 'Album'.



Colchicum autumnale poking above *Athyrium goeringianum* 'Pictum'.

combination with ferns or some of the smaller hosta at the edge of a woodland; *C. bornmuelleri* with large flowers of good substance, the color deepening as the flowers mature; and *C. speciosum*, which has

large raspberry-pink flowers with a white throat. *C. agrippinum* is the best available tessellated variety, with attractive, strongly checkered petals that make up for the rather weak perianth tube, which causes



Crocus speciosus.



Colchicum autumnale pleniflorum.

the flowers to fall over. Colchicums are the source of the drug colchicine, and are generally not eaten by pests.

It is with fall crocus that the garden truly receives a rejuvenation. With careful

selection, crocus can be in bloom not only in spring and fall, but even in winter.

Non-gardeners, especially those with culinary interests, may be aware of the saffron crocus, *Crocus sativus*. It is the red



Crocus longiflorus.

stigmas of this crocus which are the source of the costly spice. While you can harvest enough to season an occasional paella, I hesitate to suggest that your fortune is made, as it takes approximately 4,000 flowers to produce one ounce. This is one crocus which does not seem to like my garden. Plump corms do well the first season, then dwindle and decline rapidly. With its rich purple flowers it is an attractive addition to the rock garden, if only it would persist.

Far more successful is *C. speciosus*. This has been in cultivation long enough that several selections are available — 'Aitchisonii', 'Cassiope' and 'Oxonian' are but a few. One of the earliest of the fall crocus, its lavender-blue flowers with a yellow throat appear in September. It is a prolific species, increasing by both seed and offset. The thin grasslike leaves are not a problem, even where it grows in profusion. They appear in spring, grow and fade away without harming nearby plants as colchicum might. I especially enjoy this bulb when grown with *Sedum sieboldii*, whose mauve-pink flowers overlap in blooming sequence with the crocus. At the edge of woodland I like *C. speciosus* mingled with

Ophiopogon planiscapus 'Nigrescens', whose deep black leaves are an elegant foil for the lavender chalices of the crocus.

One crocus which does flower accompanied by foliage is *C. longiflorus*. The yellow-throated purple flower has good substance, and a faint fragrance of violets. Faint, that is, if you expect a four-inch-tall flower to waft its perfume to your nose. Crawl around on your hands and knees and the scent will be much stronger. It is fortunate that this species is also a free increaser as, like all other crocus, it is a favorite with the deer. I console myself with the thought that in Greece it is the goats who dine on these plants I treasure. Small comfort, and it would be best to find a place where the crocus is protected. It is charming in combination with the foliage of dwarf geraniums such as *Geranium sanguineum* var. *prostratum*, or small ornamental grasses.

A white-flowered fall-blooming crocus is *C. ochroleucus*. This flowered for me in late October/early November. The flowers seemed too frail, too thin in texture for the season, although it was attractive as it blossomed through the hoary mat of *Thymus lanuginosus*. With good drainage during



Cyclamen.

the period of summer dormancy, it has been reasonably persistent. *C. niveus* is another white-flowered species with more rounded, gobletlike flowers.

Another autumn-flowering bulb is *Allium thunbergii*, a dainty onion from Japan with umbels of lilac flowers above grasslike foliage in October. This has no objectionable onion odor, and is more than welcome for its late bloom. It looks good with *Sedum sieboldii*, thymes, dianthus and other small-scale plants.

Colchicum, crocus and allium are plants for sunny or only lightly shaded sites. *Cyclamen hederifolium* (which used to be known as *C. neapolitanum*) is a plant for the deciduous woodland. The flowers appear first, in late August and early September, dancing on naked stems like badminton shuttlecocks or a flock of dainty pink butterflies. The leaves appear later in September, beautifully marked with silver. It seems that, like snowflakes, each tuber has a different pattern to its markings. The leaves remain through the winter and only fade into summer dormancy in late May/early June. This cyclamen has attractive foliage for nearly ten months of the

year, certainly a good return for the space it occupies. This is one bulb worth cultivating for its foliage as well as its exquisite flower. Cyclamen require a soil rich in humus, moist but well-drained, in dappled shade. Plant them shallowly, only an inch or two deep, and mulch with leaf litter. The tuber neither splits, nor makes offsets, but rather grows larger in diameter and produces more flowers year by year. Generally seed is freely produced. I suggest you gather it, and sow it in a protected area, for mice, voles and chipmunks find the first-year tubers like toothsome pink caviar. This is an easy means of propagation and a sure source of plants which have not been collected in the wild. When the cyclamen is dormant in summer you could use the space for annuals such as impatiens, but be sure to remove the filler plants as soon as the cyclamen begin to grow.

When you are ordering bulbs, most assuredly look ahead to spring. But reward yourself with the more immediate pleasure of autumn-blooming bulbs.

THE INFORMATION IN THIS ARTICLE FIRST APPEARED IN DIFFERENT FORM IN *THE BULLETIN OF THE AMERICAN ROCK GARDEN SOCIETY*.

BULBS IN A BUFFALO GRASS LAWN

BY SANDY SNYDER



Blue and purple irises and white crocus in dormant buffalo grass.

Bulbs in my xeriscape lawn have been a source of spring delight. Every year between the end of January and the end of April crocus, *Iris reticulata*, daffodils and tulips become a tapestry of color on the light brown, dormant buffalo grass lawn "canvas."

Because water conservation is important in Colorado, I converted my Kentucky bluegrass lawn to buffalo grass (*Buchloe dactyloides*). This grass is a warm-season, drought-tolerant grass that is easy to grow in hot, dry areas of the country. It requires much less water and fertilizer than a bluegrass lawn. The only disadvantage of this grass is that it takes about two months longer than Kentucky bluegrass to green up in spring. To solve this problem I added color by planting bulbs in the grass. Buffalo grass lends itself well to naturalizing bulbs because it grows only between four and six inches tall.

I chose bulbs native to areas in central Asia where the climate is similar to Denver's. In the fall of 1984 I planted about 2,500 crocus, iris, tulips and other bulbs.

The bulbs make a superb show of bloom in early spring. Then their leaves develop, making the lawn look green instead of brown. The bulb leaves turn yellow and die back about the time the buffalo grass starts growing, so I can have a regular lawn in the summer and early fall. Best of all, the bulbs multiply and make larger clumps each year. They have increased 20 to 30 fold in five years, and the cumulative impact is spectacular.

Our buffalo grass/bulb garden was an

SANDY SNYDER gardens on three-quarters of an acre in Littleton, Colorado, as well as in the Rock Alpine Garden at Denver Botanic Gardens.



Red *Tulipa linifolia* and pink *Tulipa humilis*.

experiment. We didn't know anyone who had done it before and could tell us what to expect. The combinations turned out so well that I'd like to encourage gardeners in thirsty climates throughout the Southwest to try similar plantings.

Aside from weeding, the buffalo grass has required much less maintenance than bluegrass. I usually mow the lawn for the first time sometime before July 4th. By that time all the bulb leaves are very dry or gone. After that I mow about once a month with the mower set to cut as high as possible — three inches. In the fall when the grass is dormant I mow it down to one and one half inches tall, so the flowers will show up better in the spring.

I considered several factors in choosing which bulbs to plant. I wanted species that would bloom early in the spring and die back by the end of June so mowing could begin. They had to be hardy in USDA Zone 5 (to -20°) and to naturalize well.

If you do not intend to mow the grass, but rather wish to keep it as an informal meadow, bulbs with larger flowers, leaves and stalks can be used. Crown imperials (*Fritillaria imperialis*) and foxtail lily or desert candle (*Eremurus*) are candidates for a large grassy meadow. *Calochortus* and *Brodiaea*, bulbs that bloom later in the spring and into the summer, can be used in a summer meadow that isn't mowed.

When the bulbs arrived I realized that I hadn't thought out how we were going to plant them without tearing up the lawn and devoting several days to the job. My husband Bill invented a planting tool — a broomstick with a two-by-four crosspiece step that can be adjusted to make holes of different depths. This pogo stick-like tool worked so well that we set up a three-person production line and planted all the bulbs in just a few hours. One person

punched a hole in the sod. The second person dropped a bulb into the hole — some of the bulbs tipped upside down, but they all came up anyway. The third person filled the hole with dry sand (rather than lumpy soil), and we watered the whole area when we finished planting. We didn't add any bone meal to the soil because our bulbs arrived in October and we had to plant them in a hurry. It would have been too time consuming to mix the bone meal with soil, pour it in the little hole, pour a bit more soil in the small hole and then drop in the bulb. I think foliar feeding in the spring would be a good way to nourish the bulbs if you felt the soil was not rich enough.

We tried to plant the bulbs in natural patterns. The usual recommendation is to throw the bulbs up in the air and plant them where they fall. If we'd tried that method, we would have lost most of the fingertip-size bulbs in the grass. Instead, we designed two planting patterns. In one area we made spiral patterns, with the bulbs planted three to four inches apart in the center, gradually increasing the spacing to as much as 18 to 24 inches. The spirals were generally about ten feet across, and overlapped one another. We put one spiral in the center of the area, and six more at equal spacings in a circular pattern around the center one. Our other pattern was a series of six drifts, each planted with a different variety, that overlapped to make a long crescent shape. Here we also spaced the bulbs close together in the center of each drift and farther apart at the edges. Overlapping the different varieties in both planting patterns creates a more naturalistic effect. In retrospect, I'd say the spirals are more effective, and I'd suggest spacing them randomly around a lawn rather than grouping them as we did.

The snowdrops are always the first to bloom, and generally bloom for the longest time. They aren't as showy as the other species, but their earliness more than compensates. The different varieties of crocus bloom between mid- February and mid-April. The best effect usually comes around the end of March when the white and light-blue crocuses are still in bloom and the dark-blue and dark-purple irises open. Finally, in mid- to late-April the tulips open, and they normally last around two weeks. During spring snow often covers our lawn, but the flowers are not injured. In fact, it's delightful to see the colorful blooms against the white blanket of snow, each flower individually outlined. The irises show particularly well this way.

Mixing and matching different colors of blooms and combining bulbs that bloom at different times allow you to create artistic patterns and effects, but first you'll have to do some homework. Experiment with different species and varieties to find out how they do in your area; nearby private and public gardens are good sources of ideas. When we planned our planting patterns, we tried to put all the early-blooming bulbs in one group and the later bloomers in another area. Unfortunately, our actual bloom times varied greatly from those listed in the catalog so we had early and late bloomers in both areas. For that matter, the same bulbs I planted in my lawn I also planted in my steep, southwest-facing, stone-mulched rock garden, a much warmer microclimate in which they bloom at least a month earlier. One last note on blooming times: The first year's timing will most likely be quite different from that maintained in subsequent years.

All the bulbs have multiplied. The crocuses apparently increase by division. The first year each bulb made one flower; five

years later there were 35 flowers in many crocus clumps. *Tulipa tarda* and *T. urumiensis* are the most vigorous multipliers. They produce lots of seeds, and the way their clumps are increasing indicates that the bulbs are dividing. Tulip seedlings hide in the grass, forming just one little leaf the first season. I haven't been able to track any, but I think they can flower after two or three years. Snowdrops make large green seedpods, but they don't increase very fast in my lawn; perhaps they prefer cooler, damper conditions. The dwarf daffodils, *Narcissus asturiensis*, are increasing slowly.

In a traditional garden the bulbs are dug up and divided every few years. Last year I marked several large clumps of crocuses and *Iris reticulata* with color-coded nails. I planned to dig them up after the leaves had died and spread the bulbs to some of my other gardens. I couldn't find the nails again, and I didn't want to dig holes all over the lawn trying to track down clusters of bulbs. So, for now, I have given up on the idea. I'll just let them spread as they may until they stop blooming because of overcrowding.

In June of 1990 I created an additional 800 square feet of buffalo grass lawn, and I'm compiling another bulb wish list. *Crocus tomasinianus* is a crocus I don't have in my spring flowering group, and I also want to add the 'Ruby Giant' crocus to my collection. The rest of my additions will be fall-blooming crocus because I don't want a summer meadow in this part of the yard: *Crocus medius*, with violet-purple blooms, *Crocus pulchellus*, with pink-lavender flowers, and *Crocus speciosus*, which comes in different shades of blue. In our spring collection we have observed that the bulbs that send up flowers before leaves show much better than the bulbs that send up the leaves and flowers together. Fall crocus

send up their leaves in the spring. Only the brilliant flowers will dot the dormant grass in the fall.

Buffalo grass makes a very acceptable suburban lawn, and the bulbs make the lawn a seasonal delight. What's more, I feel

that I am doing my part for water conservation, and saving money and work by converting my traditional bluegrass lawn to a new type of xeriscape landscaping.

ADAPTED FROM AN ARTICLE THAT FIRST APPEARED IN *FINE GARDENING* MAGAZINE.




Tulipa tarda.



Tulipa humilis.

BULBS IN MASS PLANTINGS

BY HENRY J. EULER III



One of the great joys of spring is visiting public gardens to revel in the beauty of large, massed bulb displays. I make the pilgrimage to various gardens to affirm my belief that spring is truly a time of spiritual and physical awakening. The same effect can be created in your own garden. My small suburban lot (one-eighth of an acre) contains 1,500 bulbs including daffodils, chionodoxa, crocus, tulips and gladiolus. Another backyard garden of 280 square feet includes 250 daffodils mingled with woody and herbaceous plants. These small gardens provide a knockout punch of color each spring.

Before opening a bulb catalog, take a good hard look at your garden and inventory the unplanted spaces. For example, look at the foundation planting, and note any voids between plants that could be

filled with bulbs. Select those that will complement the existing plants in color, size and scale. Avoid planting a single row of bulbs along the front edge of the bed.

Look over the plantings near the patio, deck or porch. These areas can be improved by tucking in a few minor bulbs followed by tulips, daffodils or fritillaria. After the spring bulbs, plant masses of caladiums, tuberous begonias, border dahlias, gloxinias or achimenes. The key to planting around patios, decks and other outdoor "rooms" is to use plants that flower or show color when the area is to be used. If the area will be used in the evening, be sure to include white, silver or variegated plants to add contrast to the nightscape.

A herbaceous border offers wonderful locations for massing bulbs. The most effective planting technique is to accent specimen plants with groups of bulbs. Daffodils, tulips or hyacinths are usually planted in groups of twelve, large bulbs like *Fritillaria imperialis*, *Lilium* or galtonias in groups of six and the minor bulbs in groups of three to four dozen. Allow ample room for the col-

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onizers like crocus, chionodoxas, narcissus and montbretias. After flowering, bulb foliage will yellow and die. If this disturbs you, locate the bulbs so that the foliage of emerging perennials or woody plants will hide the dying leaves. Before deciding to naturalize bulbs in the lawn, remember that the bulb foliage must not be cut until it has matured or yellowed. In the New York metropolitan area this is around the first of July. By that time the grass could reach substantial height.

Be sure to note sites in the garden that will accommodate a naturalized planting. In naturalized areas try to capture the feeling that the plants grew and colonized without a helping hand. Excellent areas for naturalized plantings include the banks of brooks, edges of ponds, along paths and in orchards and meadows, under trees, beneath shrubs or the base of hedges, with ferns, along a wall and around the base of garden ornaments. To achieve the natural look, plant in irregular groups and use the same varieties in any one group. Excellent naturalizers include *Crocus*, *Colchicum*, *Scilla*, *Muscari*, *Lilium*, *Allium*, *Chionodoxa*, *Narcissus*, *Galanthus* and *Hyacinthus*.

With planting locations identified, the next consideration is plant combinations. Blue-flowered plants like *Scilla*, *Muscari* and *Chionodoxa* go well with shrubs like *Magnolia tomentosa* (*M. stellata*), *Hamamelis* species, *Forsythia* and *Prunus glandulosa*. A shrub border or wall shows tulips to best advantage. But their wide range of colors also complements *Wisteria*, *Syringa*, *Spiraea*, *Iberis*, *Berberis* and *Ilex*.

Narcissus offer a large and varied group of colors, heights and flower shapes, making them useful in most areas of the garden. They fit especially well around shrubs and with a little planning it is possible to have bloom over much of the spring sea-

son. The small cupped daffodils such as 'Actaea', 'Foundling' 'Cragford' 'April Tears' or 'Geranium' look wonderful under flowering trees and the miniatures like 'February Silver' 'Jack Snipe' and 'Tete-a-Tete' do well as accent plants for rock gardens and as edging plants. Use them in perennial borders or with ground covers such as ivy, *Ajuga*, *Vinca* or *Cotoneaster*. To add drama and delight to the garden, include some of the double-flowered daffodils ('Cheerfulness', 'White Lion' or 'Sir Winston Churchill') and fragrant daffodils ('Thalia', 'Cheerfulness', 'Baby Moon', 'Andalusia' or 'Pipit') in the bulb border.

Hyacinths have great appeal with their bold colors and fragrance. This versatile plant is often massed formally but lends itself to naturalizing in the border. Hyacinths combine well with *Arabis*, *Alyssum*, *Myosotis*, tulips and pansies.

The crocus offer a host of planting options. They grow well with low ground covers (*Vinca*, *Sedum*, *Ajuga*, *Euonymus* and *Hedera*, for example) that can support their flowers and protect them from being splattered with mud during rains. When planting crocus with ground covers, be sure the crocus will not be crowded over time. These little garden gems mass well under trees or shrubs and combine with *Eranthis* and *Chionodoxa*.

Select the bulbs that will fulfill the needs identified on the garden survey, including height, bloom period, color, foliage type and flower style and shape. Numerous bulb catalogs are available to assist the decision-making process.

After the bulbs are ordered and arrive, it is time for planting. Most bulb books discuss planting with either a trowel or a dibble. These tools work very well in situations where the soil has been prepared by rototiller or the bed has been in cultivation



A golden mass of naturalized daffodils.

for a while. For planting in undisturbed soil, as in naturalizing bulbs, leave the trowel and dibble on the tool bench; a soil auger attached to an electric or gasoline-powered drill is a better tool for compacted soil. The only caution, learned from experience, is to watch out for sudden kick back from the drill if it runs into hard soil, rocks or roots. One tool to avoid is the common bulb planter, which looks like a can with both

ends removed, on a shaft or handle. The low-cost versions break and the expensive models work as poorly as the less expensive ones. The problem is a basic design flaw that does not take the soil texture into account. Soils that have a high clay content tend to be difficult to dislodge from the cookie cutter-like planter, while sandy soils will inevitably fall through the device and be of no value for refilling the planting hole.



Daffodils lining pathways at a large estate.

Most gardeners have probably tried this device and if only a few bulbs were planted the job was finished before frustration caused the tool to be left curbside for garbage pick-up.

The most efficient, economical device for planting large numbers of bulbs is the common pick mattock. Do not confuse this tool with the cutter mattock. The pick mattock has two pointed ends, one shaped like

a duck bill. The technique is simple and a two person team can plant bulbs at a rate of one every three to five seconds in light-textured soils. The person swinging the pick should kneel on the ground with the torso erect. The pick is swung in the same manner as in the standing position. The key to success is that the pick must enter the soil at a right angle. To reduce fatigue allow the weight of the pick to do the work. In soft

ground the point of the pick will pierce the soil to a depth of seven to ten inches and in hard ground five to eight inches. With the point still in the ground, rock the pick back and forth to enlarge the hole, pulling forward to firm the soil and remove it from the hole. As the pick clears the hole the person planting the bulbs slips a bulb into the hole, making sure that the bulb makes contact with the bottom of the planting hole; then the operation is complete. It will take five or ten minutes to work out favorable positions for the picker and the planter. The most important point is that the person swinging the pick **MUST ALWAYS** have the planter in sight to avoid injury. As the team gains confidence the job will proceed at a rapid rate. To avoid fatigue switch positions after planting 100 or so bulbs.

Large bulbs, like lilies, can be planted quickly with a post hole digger. Lilies will require deeper planting than the smaller bulbs; the general rule is eight to ten inches deep. Plant deeper in sandy soils and less deep in heavy soils. Avoid sodden or wet areas totally as the bulbs will rot. The medium-sized bulbs — daffodils, tulips, hyacinths and fritillaria — prefer planting depths of four to seven inches, depending on the soil type per above. As a general rule, plant bulbs at a depth three times their height. For example, a one-inch bulb would require a planting hole three to four inches deep.

In natural settings space large bulbs nine to 12 inches apart, medium bulbs four to six inches apart and small bulbs three to five inches apart. Naturalized plantings are seldom divided or transplanted; allow ample room to grow.

Tulips are good candidates for formal planting but a poor choice for naturalizing. Some varieties may flower for five years, but most naturalized tulips will decrease in

size and flower poorly after two to three years. To achieve maximum results with tulips, the bed should be excavated to a depth of six to eight inches. Loosen and rake smooth the soil in the bottom of the planting hole, add superphosphate at a rate of three pounds per 100 square feet, set the bulbs into the hole six inches on center and fill the area with soil, being careful not to knock over the bulbs. Planting tulips properly is labor intensive but the results are worth the trouble. The plants will be uniform in size. On large areas where it is totally impractical to remove the soil from the planting hole, prepare the soil by rototilling to a depth of eight inches and the bulbs can be planted with a trowel directly in the bed. One last consideration is weed control. The most satisfactory method is mulching.

On the north shore of Long Island experience has shown that the best time to fertilize bulbs is in the fall around the first week of November with a second feeding in the spring after flowering. It is a good idea to incorporate a phosphate-type fertilizer at the time of planting. This can be easily accomplished if the bulbs are to be planted in beds. For the naturalized planting, fertilize in the spring and the fall with either a chemical or organic fertilizer. Regardless of the product, read and follow the label directions. Take care when applying a fast-acting chemical fertilizer in a mixed planting of bulbs, shrubs and perennials. Avoid extended contact of the fertilizer and the foliage. For best results, wash the fertilizer into the soil with a hose or irrigation system.

If you follow these simple guidelines, spring and summer will be delightful and rewarding. A walk through your garden will be as pleasurable and satisfying as any public garden tour.

BULB GUIDE ACCORDING TO HEIGHT

4" TO 8"	<i>Galanthus</i> (Snowdrops)	white	EARLY SPRING
	<i>Crocus</i>	white blue purple yellow, striped	EARLY SPRING
	<i>Anemone blanda</i>	blue pink red white	APRIL-MAY
	<i>Muscari</i>	blue white	APRIL-MAY
	Species tulips	various colors	EARLY SPRING
8" TO 12"	<i>Greigii</i> tulips	various colors	APRIL-MAY
	<i>Kaufmanniana</i> hybrid tulips	various colors	EARLY SPRING
	Hyacinths	various colors	APRIL
	Double early tulips	mixed colors	MID-APRIL
12" TO 20"	Daffodils	mixed colors	APRIL-MAY
	<i>Fosteriana</i> tulips	various colors	EARLY SPRING
20" TO 30"	Triumph tulips	mixed colors	APRIL-MAY
	Parrot tulips		
	Lily flowering tulips		
	Darwin hybrid tulips		
	Cottage tulips		
30" +	<i>Allium</i>	purple rose lilac white	APRIL-JULY
	<i>Fritillaria</i>	red yellow plum	APRIL-MAY



Fritillaria persica.

BULBS IN THE INFORMAL GARDEN

BY MADELEINE KEEVE

AND

JOHN EMMANUEL

The first recorded use of bulbs in an informal setting is found in The Iliad, Book 14. On a barren mountain in Turkey the goddess Hera, in an effort to assist the besieged people of Troy, seduces her consort, Zeus, who favors the opposing Greeks. The two immortals lie, Homer tells us, in a bed of hyacinths and crocus. No doubt the formal use of bulbs began with the mortals, who dug up these fleeting wildflowers, which they found in the mountains and cultivated in pots on their window ledges.

Whether you are scattering bulbs in a meadow or accommodating them in a tiny backyard, there is an infinite variety of plant combinations with which to create your own Olympic idyll. However, you must be patient and await the sometimes slow fruition of your efforts to create an informal garden. For 20 years the spectacle at the Wild Garden at Wave Hill has been unfolding, thanks to the cumulative

planning of its gardeners. The mature trees and shrubs planted fifteen years ago (indeed, some of the trees go much further back) provide the necessary structure for the seasonal drama of the herbaceous plantings.



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Fritillaria imperialis.



Canna.

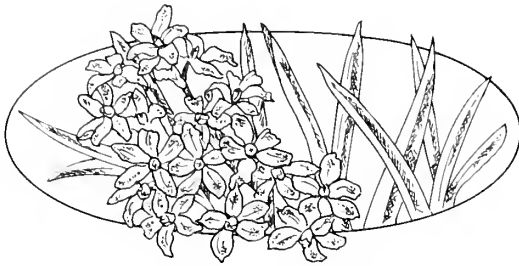
The Wild Garden is divided by a series of narrow winding paths into fourteen variously shaped beds covering a hillside. Foils for the herbaceous plants, the trees, shrubs and large stands of grasses divide the beds into many diverse tableaux. As visitors round each corner, a new tableau appears. While tiny *Tulipa batalinii* grows in a south-facing dry bed, *Fritillaria imperialis* (crown imperial fritillary) towers not far off in a lush enclave in the shade of an *Amelanchier canadensis* (shadbush), which divides one bed from another. Months later in another bed, the giant leaves of the tropical tuber, *Colocasia esculenta* (elephant's ear) extend beyond a large rock where they contrast with a wonderful variegated *Yucca* 'Bright Edge' that grows amid a sprawling *Cedrus deodara* 'Prostrata' (prostrate deodar cedar).

In a formal garden, where spring tulips are massed in unified colors, the gardener hopes for a spectacle that will remain relatively fixed in time. In the informal garden, on the other hand, change is the force which the gardener must use to great advantage. Often as a plant unfolds it reveals aspects of its personality which work perfectly, for a moment, with the characteristics of a neighboring plant. For example, in one of our beds *Penstemon renustus azureus* begins the season as a rosette of vibrant purple red leaves, perfectly suited to the small purple *Iris pumila*. Later the penstemon, now bearing

its developing flower stalks of dark red, encounters the diminutive *Narcissus* with its flat, pale yellow flowers. By mid-May, with its spires bearing pendulous lavender flower buds, the penstemon blends well with the late-blooming, brilliant red *Tulipa sprengeri*. When at last the penstemon's lavender flowers are fully open in early June, it's worthy of admiration on its own merits. Every plant offers a thousand faces against which any number of other plants, also changing, can work for a moment. The principle underlying the creation of these scenes is the understanding that bulbs co-exist happily with a wide range of plants.

In another grouping *Narcissus* 'Sun Disc' draws *Aurinia saxatilis* (basket of gold) out of its shabby winter attire to its peak of spring beauty. And it needn't be *N.* 'Sun Disc'; any diminutive narcissus of your liking might do. We happen to have *N.* 'April Tears' growing nearby *Iris pallida* 'Variegata'. The two seem to strike it off with a medley of yellows and greens. But what if the *Iris* were *Acorus calamus* 'Variegata' or the pale leaves of a sprouting *Liriope spicata* 'Silver Dragon'? For the gardener willing to chance a bad combination, the opportunities of discovering a good one are endless.

One of the persistent challenges of using bulbs informally is attending to the ripening foliage which must not be cut to ensure the bulbs' survival. The scale of a planting will often determine what looks



Chionodoxa luciliae.

good. For example, where daffodils are naturalized in a meadow on a large scale, yellowing foliage in the uncut grass does not seem unruly. At close hand in a small garden, though, it can be a problem. Because we combine bulbs with a variety of other plants, we try to find ways to hide the dying leaves. Sometimes their ungainly foliage (daffodils being a prime example) can be tucked beneath neighboring plants. More often than not, the foliage is tolerable because there is so much going on in the vicinity. Occasionally you can even use the ripening seed heads to advantage. For example, *Allium karataviense* rises out of two broad, striped basal leaves of a bluish hue. As the allium dries, both the leaves and the flower heads pass through various stages of pink, which combine well with the glaucous foliage of nearby *Crambe maritima*, *Glaucium flavum* and other silver-foliage plants.

After the rush of spring, summer and fall bulbs offer an often unexplored realm of possibilities. Lilies are among the first to bloom in the Wild Garden. Between the blue-needled limbs of *Pinus flexilis* 'Glauca Pendula' (prostrate blue limber pine), *Lilium x dalhansonii*, a copper-colored lily spotted with purple, appears, towering over the low-lying limbs. *Clematis* 'Betty Corning' scrambles over the pine, casting its pendant purple bells like a net under the lily. Because 'Betty Corning' blooms for a long time, *L. x dalhansonii* is only one of

several lilies we use to create a continuum of bloom. You *can* plant closely, if you keep an eye on things and make sure that plants don't smother one another.

Sylvia Crowe once wrote: "Garden features are far more often too small than too big." Two examples in the Wild Garden that illustrate this idea feature tropical plants that never bloom for us. In both cases they are large plants growing in small spaces for dramatic effect. The aforementioned *Colocasia esculenta* growing between the yucca and *Juniperus rigida* is one example. Another is *Dahlia imperialis*, which grows to an impressive 15 feet before the first frost kills the foliage. In front of the treelike dahlia, we mass cannas with strong linear red leaves. Vining *Gloriosa rothschildiana* (gloriosa lily) tumbles over old iris leaves nearby.

One of the biggest problems gardeners face with bulbs is planning ahead. The moment of inspiration often comes when the plants are blooming, while the moment to plant bulbs comes months later. When we made a note back in early spring to add *Fritillaria imperialis* 'Aurea' to Bed A, the bed was a clear slate bearing the existing *Fritillaria*, a group of yellow narcissus and clusters of *Chionodoxa luciliae*. But by August the bed was overgrown with the spires of countless perennials. To avoid this kind of confusion, we often plant unfamiliar bulbs in a test bed. When they come into bloom we get ideas. That is when we move

them in among suitable companions in the Wild Garden. The desired effect is immediate. Where a garden picture no longer works, or where bulbs are overgrown by shrubbery, we feel free to move bulbs after they make their appearance. Spring planting also avoids the danger of cutting into bulbs already present — a frequent occurrence when bulbs are added to others in the fall. In the case of the *Fritillaria*, which we already know and want to increase, we fix green stakes in the desired locations in spring, when the ground is still a clean slate. When the bulbs arrive in the fall, we know exactly where to plant them, despite the abundance of autumn camouflage.

In the case of *Canna*, *Colocasia*, *Dahlia* and other summer bulbs, which must all be dug up and stored in a cool location after the first frost, spring planting is a *sine qua non*, and their placement requires a familiarity with their habits. If they are new to you, don't be afraid to experiment with them; you can always plant them in a new spot next year. One year, a colocasia was accidentally planted among some cannas at the edge of a path. The result was spectacular, proving that accidents can lead to wonderful discoveries.

An informal garden should not be mistaken for a low-maintenance garden. Since change is the great operating force, the gardener must keep a constant watch, day to day, lest the wonderful tapestry of plants come undone by one or two weedy species. For example, *Endymion hispanicus* is a proven thug (albeit a lovely one), so it has been banished to the rough outskirts of the garden, where it can spread happily beneath trees. Be vigilant, but not intimidated. While change brings on the weeds and rush of growth that stagger us at the beginning of every season, it also brings new visions and new inspiration.





Lycoris squamigera.

DAFFODILS

BY JUDY GLATTSTEIN

Daffodils are perhaps the most widely recognized of bulbs. They are common in gardens and among the first flowers we learn to recognize as children. Spring always seems to have arrived when I see bunches of golden daffodils and branches of pussy willow for sale. In autumn, the big, brown onionlike daffodil bulbs provide a promise of flowers after winter's end. Readily obtainable, simple to plant, reliable in flower, what more could be asked? Some thought is required on how to make effective use of their bright spring display, and conceal the yellowing foliage later on.

"Daffodil" is merely a common name for *Narcissus*. This confusion is sometimes compounded by the use of "jonquil," especially in the South, to refer to the common daffodil, when there is a separate division among daffodils, the *jonquilla narcissi*. All the different groupings of daffodils depend on the form of the flower: relative length of cup to petals, shape of the cup, etc.

Use daffodils in groups of ten or more of a kind. Plant three times as deep as the bulb is high, perhaps a little deeper in light sandy soil, more shallowly in heavy clay. While daffodils can tolerate very moist soils while in growth, winter wet can lead

to bulb rot. Avoid planting in heavy wet soils; either plant in a different location or make a raised bed to improve drainage. Rather than use the so-called naturalizing mixtures which flower in random display, I prefer to buy separate varieties and plant them in distinct groups. This allows me to create some pattern, more effective than a spotty effect. Daffodils planted in a woodland have a tendency to face the sun while in bloom. This means if they are planted on both sides of a path running east-west, those on the north side of the path will face it while those on the south side will face away from the path. This is less noticeable in open situations.

Daffodils can be used in many different ways. They are elegant in a formal border, mingled with peonies and daylilies to disguise the aging bulb foliage. It is a poor technique to fold, braid or tie up bulb foliage as it reduces the ability of the leaves to send food down to the bulb for the next year's bloom. As was indicated, daffodils are very suitable as woodland plants, used with hosta and ferns for companion plants to hide their old yellowing leaves. Daffodils can be planted in grass, but then the grass should not be mown until the bulb foliage has ripened. Thus a coarse grass situation

such as in an orchard or a meadow is more suitable than a lawn right next to the house.

It is the trumpet daffodil, with one flower per stem and a cup equal to or longer than the petals, which is most familiar. This is the "host of golden daffodils" of Wordsworth, the daffodil spilling down the grassy hill at the Brooklyn Botanic Garden, the cut flower of the florist. Many cultivars exist, in variations on the theme of yellow, white and bicolor. 'King Alfred', 'Dutch Master' and 'Unsurpassable' are sunshine yellow, 'Beersheba' and 'Mt. Hood' are classic white and there are bicolors such as 'Spellbinder' with white trumpet and lemon yellow petals. The pink trumpet daffodils have the best color when the flower first opens and under cool conditions, so they are best used in a shaded situation.

Long-cup daffodils also have one flower per stem, but the cup is less than equal to the petals. The flowers can be yellow as in 'Carlton', white as in 'Ice Follies', or bicolor as 'Carbineer' with an orange cup and yellow petals or 'Louise de Coligny' with white petals and apricot pink cup.

Short-cup daffodils have one flower per stem, with a cup a third less than the length of the petals. 'Birimá' has an orange cup and yellow petals; 'Audubon' has a pale yellow cup edged with orange-red and white petals.

Next come the double daffodils, with no regard to the proportion of cup to petals. 'Earlicheer' is ivory white with some lemon yellow petals mixed in; 'White Lion' is waxy white with some pale yellow petals in the center; 'Golden Ducat' is a sport of 'King Alfred' and just as golden yellow.

Triandrus daffodils have *N. triandrus* as a parent, and like the species have several small, nodding white to pale yellow flowers per stem. 'Angel's Tears' is white.

Cyclamineus daffodils come from *N. cyclamineus* and have petals that reflex back, "like a mule about to kick," according to one old book. These hybrids prefer partial shade and a soil which does not dry out in summer. 'February Gold' is yellow, flowering in late March or early April in my Connecticut garden; 'Peeping Tom' is also yellow; 'Jenny' is white. These are lower growing cultivars, often a foot or less in height.

Jonquils, the *N. jonquilla* hybrids, grow 8 to 18 inches tall and have two to six sweetly fragrant flowers later in the season. 'Pipit' opens a soft lemon yellow with the cup fading to white; 'Quail' is soft golden yellow; 'Baby Moon' is buttercup yellow and 'Lintie' has an orange-yellow cup and yellow petals.

Paperwhite narcissus, familiar for coaxing into winter bloom indoors in a bowl of pebbles, helping restless gardeners survive the winter, are tazetta daffodils, bunch-flowering hybrids of *N. tazetta* with four to eight or more sweetly scented flowers to a stem. These are best used outdoors in the South and for indoor bloom in cold winter regions, as they are less hardy than the other groups. 'Bridal Crown' is a double white; 'Cragford' has an orange cup and cream-white petals; 'Geranium' has a geranium red cup and white petals; and the familiar 'Paperwhite' (a generic name) and 'Soleil d'Or', sometimes called Chinese sacred lily, are familiar white and bicolor yellow-and-white varieties. If grown indoors in pebbles and water, they should be discarded after flowering for they've exhausted food reserves and will be too weakened to salvage for another season.

Pheasant's eye daffodil, *N. poeticus*, flowers in May. The flowers, one per stem, have a small ruffle of a cup, pale yellow edged with red, and white petals. 'Actaea'



Daffodils and primroses line a rustic wood fence.

is an old variety which I've found surviving and flowering in long abandoned gardens under brambles. 'Cantabile' has a green cup rimmed deep red.

The split corona or butterfly daffodils have the cup torn into segments, often laid flat against the petals, giving the appearance of a daisy. 'Cassata' has a white "cup" tipped with pale yellow and white petals; 'Pico Bello' has a white "cup" tipped with central orange band and white petals; 'Valdrome' has a deeper yellow "cup" and soft yellow petals. The daffodils in this category seem less persistent than, say, trumpet or poeticus cultivars. I use them in more formal settings rather than woodland or naturalized groupings.

Species daffodils are any which occur wild. Here are grouped *N. cyclamineus*, *jonquilla*, *tazetta* and others, some of which are parents of the hybrids. There is, as might be expected, a good deal of diversity. The hoop petticoat daffodil, *N. bulbocodium*, grows eight inches tall with a funnel-shaped cup and petals reduced to narrow spikes. As it prefers full sun and a sandy gritty soil, this would be a good choice for the rock garden. *N. asturiensis*

(*N. minimus*) is a miniature of the trumpet daffodils, growing only three to four inches tall with a perfect little yellow trumpet. I've had this absolutely hardy flower outdoors in late February or early March. The dainty size makes it suited for use in pots, flowering year after year under alpine house or cold frame conditions. *N. pseudonarcissus* is the Lent lily, found wild in English woodlands in March. About 12 inches tall, the trumpetlike flowers have a lemon yellow cup and sulphur yellow petals.

Daffodils have much to recommend them. They are reliable in bloom, often making offsets and increasing in number from year to year. They can be grown in sunny situations provided the soil does not bake dry in summer, and are at home in deciduous woodlands. Most are hardy in cold winter areas, and there are varieties which tolerate mild winters. The flowers are excellent for cutting; bulbs can be coaxed into early bloom indoors. Better yet, daffodils are pest free, untouched by voles, chipmunks, mice, rabbits or deer. So excellent a plant should find its place in any garden, to brighten the spring scene year after year.



A massed meadow planting of daffodils.

EXPANDING YOUR INDOOR BULB COLLECTION

BY NAOMI BAROTZ

For plant lovers in the cold climes of the northern United States and Canada, growing bulbs indoors in containers can brighten the seemingly interminable dormant winter and spring months. There is something almost magical about watching a pot of paperwhite narcissus emerge into a delicate, fragrant bouquet, or in seeing the tropical *Hippeastrum* flower open on Christmas day. Among the wide variety of bulbous plants suitable for pot culture, the tender bulbs native to southern Africa offer the amateur grower a particularly rewarding challenge. Bulbs from this part of the world have been in cultivation for centuries. Many, like *Freesia* and *Gladiolus* hybrids, have made important contributions to the horticultural industry. However, the list of ornamental bulbs from southern Africa includes an incredibly rich and diverse selection of wildflowers

highly valued for their spectacular beauty.

Some of these bulbs have been grown in the New York Botanical Garden greenhouses for over 30 years. Each year as winter sets in on the Garden grounds, pots of unusual bulbs from South Africa, Namibia, Swaziland and Botswana come into flower inside the Enid A. Haupt Conservatory, and the brilliant array of winter color lasts well into late spring.

Here is an overview of important guidelines for container cultivation, followed by a discussion of notable plants.

Cultural Guidelines

POTTING — Many of the southern African bulbs begin their growing season in our autumn. Bulbs stored in bags in cool, dry, well ventilated areas during their summer dormant period should be repotted during the fall months, preferably before any new shoots have begun to develop, as the new growth is very tender and easily broken. For most, clay pots are preferable to plastic both because of their porosity and their aesthetic qualities. The majority of these deciduous bulbs should be grown in a well

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Hippeastrum.

drained, sandy potting soil that is slightly acidic. The basic mixture consists of about one-third sandy loam, one-third leaf mold and one-third sand, with bone meal added.

READING THE SIGNS — A proper watering schedule is critical, as many of these bulbs have distinct dormant and active growing periods. It is important to understand this cycle when growing bulbs in containers. After potting-up, the containers should be thoroughly watered only once. Regular watering should begin only when there are signs of growth. Excessive watering before growth has begun can cause bulb rot. Depending on the species, either new foliage or flower buds will appear first, or as in the case of some *Nerine* species and cultivars, both will appear at the same time. This new growth signals the end of the plant's dormant period. Watering can slowly begin, becoming more regular as the growth rate increases. Once the bulbs have begun to grow actively, they should be kept evenly moist but not soggy, and should not be allowed to dry out.

TEMPERATURE & LIGHT — Most of these bulbs are actively growing during the

winter months and require full sunlight. The nighttime temperature should be between 40 and 45 degrees F and the daytime temperature between 50 and 55 degrees F. As the plants begin to go dormant during late spring and early summer, the greenhouse should be shaded; pots should not bake in the hot summer sun under glass. If shading is impossible, the pots should be moved to a shadier location or the bulbs should be lifted from their pots and stored.

The evergreen and summer-growing species also benefit from partially shaded growing conditions during the summer months. It is important to note that some species, especially those with fleshy roots, many of which are in the *Amaryllis* family, should not be lifted from their containers each summer; these fleshy-rooted species prefer to remain in their pots during the dormant cycle.

FERTILIZING — Many southern African bulbous species grow in nutrient poor soils in their native habitats. But when they are grown in containers, a proper fertilizing program is beneficial. Generally, fertilizing



Veltheimia.

NAOMI BAROTZ

should begin when the foliage is established and continue through flowering until the plants begin to show signs of entering dormancy. As a general rule, use a complete, low-nitrogen fertilizer bi-weekly at one-half strength. It is important to keep in mind that excess nitrogen will produce soft growth susceptible to disease. Since most of these plants are in active growth during the winter months in a cool environment where soil temperatures are often below 60 degrees F and watering is less frequent, urea and ammonium nitrogen used in many fertilizers can build up and injure the plant. Nitrate nitrogen liquid fertilizers or slow-release organic fertilizers are better choices. Some of the species, particularly those in the iris family, are sensitive to excess fluoride; burning of leaf margins or tips is the usual symptom. Have the fluoride level of your water tested. High levels



Clivia miniata.

MOBE WEINSTEIN



Nerine hybrids.

can be reduced with a water filter. Avoid using materials such as perlite and superphosphate. In addition, research has shown that fluoride-sensitive plants are more susceptible to fluoride toxicity when the soil pH is below 6.0.

DORMANCY — After the plants have flowered, the foliage will begin to yellow and die back, signaling the onset of dormancy. Some species do this more quickly than others. As the leaves yellow, decrease watering gradually until the bulbs have fully entered their resting stage, at which time watering should be stopped. At this time — late spring to early summer for most winter-growing species — the pots can be cleaned of dead foliage and flower stalks.



Freesia x *hybrida* 'Yellow'.

The Plants

THE IRIS FAMILY — *Freesia*, a small, but favored genus, is easy to grow in containers. Its arching spikes of sweetly scented flowers bloom from late winter through early spring. The flowers of the freesia hybrids are often larger and more colorful than many of the wild species. However, the species are usually more delicately marked and have sweeter scents. For example, the flowers of *Freesia alba* are white with a soft purple tinge and pale yellow markings. When potted in early September, this fragrant species flowers in mid-January. *F. refracta* has flowers with a wonderful spicy scent, which hang gracefully from a one-foot stalk. *Freesia* corms should be planted about two inches apart, one and one-half inches deep in a six-inch pot. Staggering the potting throughout the fall will extend the flowering period into late spring.

More than 100 species of gladiolus are native to southern Africa, of which about 70 species grow in the winter-rainfall areas of the Cape Province in South Africa. This group of gladiolus does quite well in the greenhouse and offers a wide variety of beautifully colored, graceful flowers. In late February, *Gladiolus orchidiflorus* displays its fragrant, elegant flowers. Its branched spikes of greenish-gray blooms are marked with a pastel purple. The icy-pink, frilly flowers of *G. carneus* or "painted lady" have deep scarlet blotches. *G. tristis* is a larger but striking container plant. Its soft-yellow flowers, which hang from 18 to 24 inch stalks, are wonderfully fragrant during the early evening hours.

Mid-March is the peak period for showy *Sparaxis tricolor*, harlequin flower. The orange-red, starlike flowers with their yellow centers marked with black are brilliant. *Sparaxis* hybrids, more often available

through the trade than the species, are equally stunning container plants.

The long wiry stalks of *Ixia*, the South African corn lily, support beautiful clusters of richly colored, starry flowers. Many *Ixia* species and striking new cultivars are well suited for container culture. Pot the corms of *Ixia dubia* in early fall, about one inch below the soil, with five to eight corms in a six-inch pot. Toward the end of April, brilliant yellow-orange flowers marked with dark centers come into bloom.

Another beautiful African genus is *Babiana* or baboon flower, so named because in its habitat, the edible corm is favored by baboons and other wild animals. Many *Babiana* species make excellent pot plants. The pleated, often hairy foliage is an added attraction to the rich-colored flower spikes. The royal blue flowers of *Babiana rubrocyanea* are accented with red centers. Planted about one inch deep, the corms should be potted up in early September; the first flower bud opens in mid-February. Another favorite species is *B. villosa*, which blooms in early spring. Its ruby-red to purplish flowers are accented by large dark anthers.

THE LILY FAMILY — For several centuries in Europe, *Lachenalia*, Cape cowslips, have been cultivated in pots as well as the garden. This large genus displays considerable variation in both foliage, flower and bloom period, which ranges from October to early May. The small, fleshy bulbs should be planted in shallow pots about one-half inch deep. The red-flowered *Lachenalia rubida* is one of the earliest flowering species. The larger, pendulous flowers of *L. bulbifera* are reddish-orange tipped with green and bloom in mid-winter. Later in spring, *L. contaminata* creates a splendid display with small white, bell-shaped flowers clustered against the dense growth of slender foliage.

There are only two species in the South African genus *Veltheimia*, both of which make wonderful pot plants. In early fall, the bulbs should be watered only when the dark-green to bluish-green leaves begin to appear. By mid to late winter, numerous pinkish tubular flowers hang from a fleshy, 18-inch stalk. Both *V. capensis* and *V. bracteata* require a dry dormant period in summer.

THE AMARYLLIS FAMILY — From late August through early November, pots of flowering South African nerines fill NYBG's greenhouse. The brilliant flower clusters in iridescent shades of pink, purple and red are a vivid reminder that the growing season for many of these tender bulbs has begun. Like many of the bulbs in the Amaryllis family, nerines do not prefer to be repotted each year. Instead, top-dress the pots with fresh soil just before dormancy ends. A dry, dormant period is important. Along with the more popular species such as *Nerine sarniensis* and *N. bowdenii*, a large selection of *Nerine* cultivars is available, offering a wide range of flower forms and color.

Haemanthus, another unusual southern African endemic, is an exotic addition to any collection. In early fall, the paintbrush lily, *Haemanthus coccineus*, produces a dense, scarlet-red flower cluster just before the two straplike leaves appear. The pair of thick, leathery leaves measure up to two feet long and eight inches wide and go dormant in early summer. *H. albiflos*, with white flowers and yellow anthers, is an evergreen species. Both species prefer a rich but well drained soil, with about one-third of the bulb exposed.

One of the more familiar and greatly admired greenhouse plants from southern Africa is *Clivia*. This evergreen plant prefers semi-shade and somewhat warmer winter temperatures than most of the other

bulbous plants. Both *Clivia miniata* and *C. nobilis* are valued for their long-lasting flowers which bloom from late winter through spring. From the fans of long, strap-shaped leaves grow strong, fleshy stalks bearing dense umbels of magnificent orange tubular flowers.

SOURCES

BIOQUEST INTERNATIONAL

P.O. Box 5752
Santa Barbara, CA
93150-5752

MCCLURE AND ZIMMERMAN

108 W. Winnebago
P.O. Box 368
Friesland, WI 53935

VAN BOURGONDIE AND SONS, INC.

245 Farmingdale Road, Rt. 109
P.O. Box A
Babylon, NY 11702

PARK SEED CO.

Cokesbury Road
Greenwood, SC 29647-0001

LOGEE'S GREENHOUSES

141 North St.
Danielson, CT 06239

ANTHONY J. SKITONE

2271 31st Ave.
San Francisco, CA 94116

BERKELEY HORTICULTURAL NURSERY


1310 McGee Ave.
Berkeley, CA 94703

CHILTERN SEEDS

Bortree Stile
Ulverston, Cumbria LA12 7PB
England

CYCLAMEN FOR GARDEN USE

BY NANCY GOODWIN

ne of the wonderful things about cyclamen is that you can have them blooming in the garden almost every day of the year. There are 19 known species, but I will write about the hardy ones that are easier to grow. Because more of them bloom in the fall than any other season, I consider that the beginning of the year. In the hot and humid Southeast the cool, clear air of fall provides the same excitement and renewed energy and enthusiasm for gardening that our northern friends experience with the first warm days of spring.

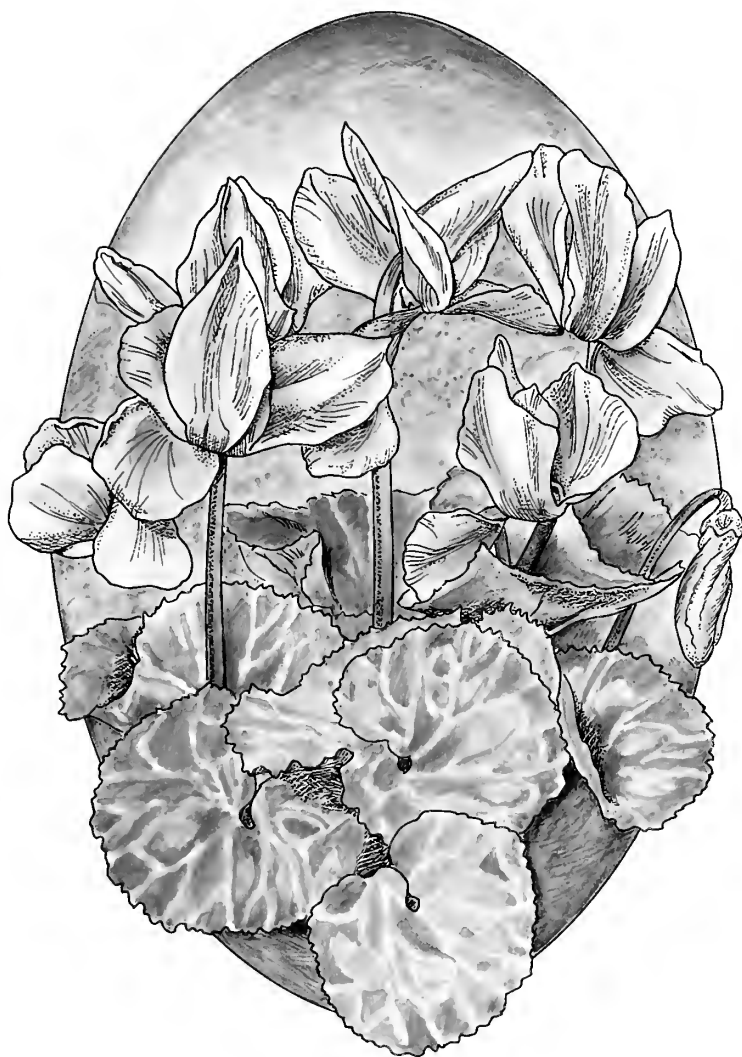
Cyclamen are easy to grow; in fact, they thrive on benign neglect. They insist on excellent drainage and some shade, but aren't fussy about soil pH. If you have heavy clay soil, add gravel and lots of humus to lighten it, or make a raised bed

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with stones mixed in the soil. Be sure to plant the tubers away from an automatic watering system. Too much water is the surest way to kill them. Plant *Cyclamen repandum* about two to three inches deep, but most of the others are happiest right at soil level. They all go dormant for part of each year, so expect the same yellowing of foliage that is normal on narcissus, but causes alarm in new cyclamaniacs. I fertilize the plants in the garden with a general all-purpose fertilizer such as 8-8-8 when they begin to grow, and for most species that is in the fall.

Cyclamen are excellent grown in combination with other small bulbs. *C. coum* looks stunning with *Galanthus nivalis*, *Crocus sieberi* and *C. tomasinianus*, and in my garden some of the fall crocuses, such as *C. speciosus*, mingle handsomely with *C. hederifolium* and *C. graecum*. They are attractive with ferns and small hostas, but be sure to select the smaller cultivars and species that won't smother the more delicate cyclamen. *Helleborus orientalis*, *H. niger* and *H. foetidus* are all happy in the same situation, and they provide foliage when cyclamen are resting in the summer.

Cyclamen hederifolium is especially cheerful for it may bloom as early as May,



Cyclamen.

giving us one of the first signs of the fall season ahead. I have often wondered just what trigger mechanism stimulates the production of these elegant flowers with their swept-back petals. I believe it is a

change in temperature. When days and nights become only a little cooler, after a period of warm weather, a few flowers of this species may be found. The year 1990, for instance, was strange in many ways,

with very warm weather in winter and a spring that alternated between hotter than normal and colder than normal temperatures. *C. hederifolium* was blooming by mid-May, and it didn't stop until November. The peak of bloom is from late August through October, and then the woodland floor is carpeted with masses of pink or white flowers, many of which are fragrant. The flowers precede the leaves, and in mid-fall the appearance of infinitely variable leaves signals an end to the production of flowers. Building a collection of different leaf forms is a temptation few can resist. They come in many shapes, from elongated sword forms, to ivy ones, nearly round and heartshaped. The colors and patterns of variegation go from dark green to silver, with many combinations in between.

C. graecum blooms at about the same time as *C. hederifolium*, often producing flowers in July and August but is at its peak of bloom in September. It has been a pleasant discovery that this species is hardy enough to grow in the cold part of Zone 7 where I am gardening. It has survived our record cold of -12 degrees F with no protection. This cyclamen is one of the few that is identifiable as a dried tuber. The tuber itself is corky and the roots are large and fleshy, unlike those of any other species. It grows in Greece in stony, sunny areas, and I am growing it in considerable sun on the south side of a large *Cedrus deodara*. The flowers are similar to those of *C. hederifolium*, but there are darker red-violet veins on the petals and the interior of the mouth is grape-colored. The leaves have a velvety sheen and are variable; some are all silver.

Just as the leaves are beginning to appear on *C. hederifolium* the flowers of *C. cilicium*, *mirabile* and *intaminatum* may be

seen throughout the garden. These three species are closely related. In fact, *C. intaminatum* was considered a subspecies of *C. cilicium* until recently. Both *C. cilicium* and *mirabile* produce their leaves shortly before or with their flowers, but the third one has its flowers first. *C. intaminatum* is truly a miniature plant; the flowers are about one-half inch long and are white or very pale pink with tiny gray veins that don't make it look dingy. The leaves are round with beautiful patterns of silver or dark green. *C. cilicium* and *mirabile* have elegant flowers often with twisted petals in shades of red-violet to pure white, and their leaves are usually exquisitely marked in patterns of silver. *C. mirabile* has petals with fimbriated tips and somewhat angular leaves. These three species will provide flowers until well into December when *C. coum* takes over.

Winter-flowering cyclamen provide interest and color in the garden when there is little else. They make visits to the woods, even on cold days, worth bundling up for because the flowers can tolerate 10 degrees F. Because of the extraordinary number of distinct forms, we have planted areas of them in many different sections of the garden and they have been happy everywhere. We have them under a red-bud, *Cercis canadensis*, on the north side of *Cedrus deodara*, in a stony rock garden just to the north of a large *Quercus alba*, and on a steep hillside in the woods beneath *Juniperus virginiana*, *Cornus florida* and *Carya ovata*. The flowers may be white, pink or dark magenta, all of which are attractive, but the dark ones show up best against the fallen, brown leaves or snow. Here, too, leaf patterns vary from silver with tiny green veins and a slender green margin to dark green with no variegation at all. The leaves precede the flowers by sev-

eral months. It is tantalizing to see the buds weeks before the flowers finally open.

Cyclamen libanoticum has also proven hardy growing under *Cornus florida* in our woods. It has the distressing habit of losing its marbled, pewter-colored leaves if there is a prolonged cold spell, but its tubers remain firm. The flowers are large, and of an unusual shade of salmon-pink with attractive, darker bird-in-flight patterns at the base of each petal.

C. pseudibericum has the most impressive, showy flowers of any hardy cyclamen. It blooms from late winter through early spring. The flower color varies from pink through dark red-violet and the flowers have an almost black marking just above the white base of each petal. I am growing them with a mass of blue *Anemone blanda* under a pear tree that blooms at the same time, and the combination is splendid.

C. repandum with its twisted, medium-pink, fragrant flowers is the last of the spring-flowering, hardy cyclamen. Its ivy-shaped leaves often appear as early as February in North Carolina, but the flowers are present in March and April and plants go dormant shortly thereafter. This is one of the few species that needs to be planted about two to three inches below ground and that insists on shade.

Throughout the summer *C. purpurascens* blooms continuously, thus completing the year of flowering cyclamen. Although this is the hardiest of all the species, it isn't the easiest one to establish. It needs shade, and some moisture, but when established, is a constant joy, for unlike the others it requires only a week or so of dormancy. The new leaves appear just as the old ones are disappearing. All of the flowers are wonderfully fragrant, and the heart-shaped leaves look so much like wild ginger, *Asarum virginicum*, that the easiest way to

distinguish them is by crushing a leaf and smelling it; asarum is the fragrant one. I am growing this cyclamen under a very large *Magnolia acuminata* and in the woods beneath *Quercus alba*.

The genus cyclamen is considered threatened throughout the world. The number of collected tubers exported from Turkey alone had risen from 256,000 in 1976 to over 6,600,000 in 1985. Although the European Community set an import quota of one million tubers from Turkey, we know that shortly thereafter, 1.6 million were imported by the Netherlands, and from March, 1988 to February, 1989 nearly 80,000 collected tubers were sent to the United States via Holland. It is a crisis, for dried-off tubers seldom grow, and although some species are in good supply, collectors can't distinguish between rare ones and the others. The importation of cyclamen now requires federal permits that state the origin of the tubers.

The solution is simple: Don't buy the large, dry tubers found in garden centers and mail-order nurseries throughout much of the world. Grow them from seed or purchase them from nurseries that propagate them. Seed sowing is easy; it just requires patience. The seeds should be soaked for about six hours, then sown covered by about one-quarter inch of potting soil. They germinate best in darkness, so cover the flats with plastic wrap and newspapers, or set them in a dark closet or basement. The seedlings will appear anytime from six weeks to about three years, generally at about the same time the species is coming back into growth after dormancy. The plants may be expected to bloom in two to three years, and once established in the garden will self sow and spread throughout the woodland, appearing in expected and often unexpected places.



Zantedeschia aethiopica in its natural habitat.



SOUTH AFRICAN BULBS FOR CALIFORNIA GARDENS

BY ROBERT ORNDUFF

South Africa supports the most spectacular, most diverse and richest bulb flora of any region of the world — with well over a thousand species of plants with bulbs or bulblike underground parts. Indeed, there are 200 native species of *Oxalis* alone, all with bulbs, and most with ornamental qualities. Most South African bulbous species occur in the winter-rainfall area of the Cape Province, such as members of *Lachenalia* and *Gladiolus*, which are concentrated there. However, there are substantial numbers of species in the summer-rainfall area that occupies most of South Africa, such as *Agapanthus* and *Kniphofia*. There is a narrow zone between these two areas, where rain is scant, but falls both in summer and winter. In the winter-rainfall area, most rain falls between April and September, equivalent to the period between October and March in the northern hemisphere, although the rainy

season in our hemisphere is often longer by a month or two. Summers are long, dry and often hot. The winters are mild, though in some upland or interior regions of South Africa there are occasional severe frosts and even snow. Climatically, this region therefore resembles California and the other areas of the globe with a Mediterranean climate. Soils in the winter-rainfall areas of South Africa are diverse, ranging from sands to heavy clays. The latter are often waterlogged during much of the winter, and several species of *Galaxia*, *Spiloxene*, *Gladiolus*, and *Oxalis* commonly spend much of the winter with their stems and underground parts in standing water.

At the University of California Botanical Garden, Berkeley, we have a substantial collection of South African bulbs growing on a gentle southwest-facing slope, where the soil is a heavy clay. Rainfall, all in winter, is about 40 inches, and when temperatures drop into the 20s the foliage of several species shows damage. Our success in growing these plants in the ground has varied — some species (such as *Wachendorfia paniculata* or members of the genus

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RECOMMENDED READING

*Bulbous Plants of Southern Africa:
A Guide to Their Cultivation and
Propagation*, by Niel du Plessis
and Graham Duncan. 1989,
Tafelberg Publishers Ltd., Cape
Town.

SOURCES

McCLURE AND ZIMMERMAN
P.O. Box 368
Friesland, WI 53935

AMERICAN PLANT LIFE SOCIETY
P.O. Box 985
National City, CA 92050
(issues annual seed/bulb list
with many unusual items)

RUST-EN-VREDE NURSERY
P.O. Box 231
7848 Constantia
South Africa

VON LYNCKER NURSERY
P.O. Box 1820
7824 Wynberg
South Africa

HOLMES NURSERY
P.O. Box 6007
7610 Stellenbosch
South Africa

Cyanella) have disappeared due to unknown causes, some grudgingly flower (such as the double form of *Oxalis pes-caprae*) but do not proliferate and others (such as *Gladiolus tristis* and *Babiana* species) have "migrated" out of their sites via seeds and dot the slopes of the garden's African Hill.

Interestingly, one of the worst pests in southern and central California gardens and pastures is the ill-named Bermuda buttercup, *Oxalis pes-caprae*, a beautiful, yellow-flowered South African native that is also pestiferous elsewhere in the world, including South Africa. However, our small colony of this species, collected from a native, non-weedy population in South Africa, is well-behaved, and has stayed put for almost two decades. This species is worth a try, but needs to be watched for potential escapees.

Although the growing season for winter-rainfall South African bulbs is winter, flowering may occur at various times of the year. Once the rains begin in the fall, most *Oxalis* species, as well as some species of *Spiloxene*, *Romulea* and *Lachenalia*, come into flower; the flowers in some may precede the leaves. Other groups flower in mid-season (members of *Watsonia*, *Sparaxis* and *Ornithogalum*), or late in the season (other species of *Lachenalia* and *Ornithogalum*, and many ground orchids). A few groups flower in the dry season, often long after the leaves have withered. These include the well known *Amaryllis belladonna* and *Nerine* species and hybrids, but also the larger, coarser *Boophone* and *Brunsvigia*. A selection of watsonias can provide flowers from spring through late summer. Favorites of mine are members of the genus *Gethyllis*, which in summer produce fragrant whitish flowers resembling those of *Colchicum*, and if bees are active, a few weeks later the curious, raspberry-

scented red fruits emerge from the ground.

Although many South African bulbs (such as *Homeria*) are poisonous and immune to plant-eating pests, gophers can be destructive if they get into bulb beds and can decimate certain choice edibles in a matter of hours. Although moles do not eat bulbs, their burrowing activities can disturb plantings. If moles or gophers are a problem, a raised bed lined with chicken-wire can keep them out. Insect pests seem to be relatively few, although some groups, particularly *Lachenalia*, are susceptible to leaf and stem fungal infections.

Bulbs of most species (except the largest, which you may wish to plant singly) can be planted in small groups of five to two dozen for maximum effect. Species with small bulbs should be planted with the bulb tips one or two inches below the soil surface; larger species can have the bulb tips exposed, and a few (such as the schmoo-like *Boophone*) prosper if the bulbs are placed with just their base touching the soil so that most of the bulb is above ground. This planting practice is not necessary, but the large bulbs sitting on the soil surface add textural interest to the garden.

Although our clay soil suits many species, I think better success would be had if the clay were mixed with coarse sand, or if the bulbs were placed on a sandy substrate two or three inches deep and covered with whatever soil your garden provides. This enhanced drainage might avert some disease problems, but in drier areas it might also mean having to add water during dry spells. Application of a dilute, balanced fertilizer (5-10-10) early in the growing season is often beneficial, though many species do well without this.

Good companion plants are succulents such as *Haworthia*, the smaller aloes and euphorbias, *Gasteria* and many mesembs

which thrive under similar conditions. It is probably best to avoid planting your bulbs with drought-tolerant shrubs, as ultimately these shrubs may cast too much shade for the bulbs and also compete for water and nutrients. Placing large rocks throughout the bulb bed can add visual interest as well. Many South African bulbous genera such as *Oxalis* and *Lachenalia* proliferate by producing bulbils, and require lifting and sorting every three or four years, with only the largest bulbs returned to the bed. The smaller "discards" can be traded with a fellow enthusiast. *Lachenalia* can be propagated by leaf cuttings, and many of the larger bulbs can be propagated by shallowly slicing the bulbs. I advise against planting winter-active South African bulbous species where they will receive water in the summer. Some species can tolerate it, but others will rot.

One of the frustrations of attempting to establish a collection of South African bulbs is that so few species are available from dealers in the United States. *Amaryllis belladonna*, *Freesia* hybrids, *Sparaxis*, *Watsonia* and *Ixia*, *Ornithogalum thyrsoides*, a very few *Oxalis* species, *Lachenalia bulbifera* and the Calla "lily" and its relatives, *Zantedeschia*, are not difficult to find at reasonable prices. A few specialty nurseries stock larger numbers of species and genera, many of outstanding horticultural merit, but unfortunately at a very high price. My suggestion is that if you locate a domestic source of unusual species, buy what you can afford, start them in pots, and once a small colony has become established via bulbils, try your extras in the ground. Seeds of many unusual species can be obtained from dealers in South Africa, and seedlings of some genera (*Oxalis* and *Lachenalia* are examples) will flower the third year after planting. For beginners, I suggest species

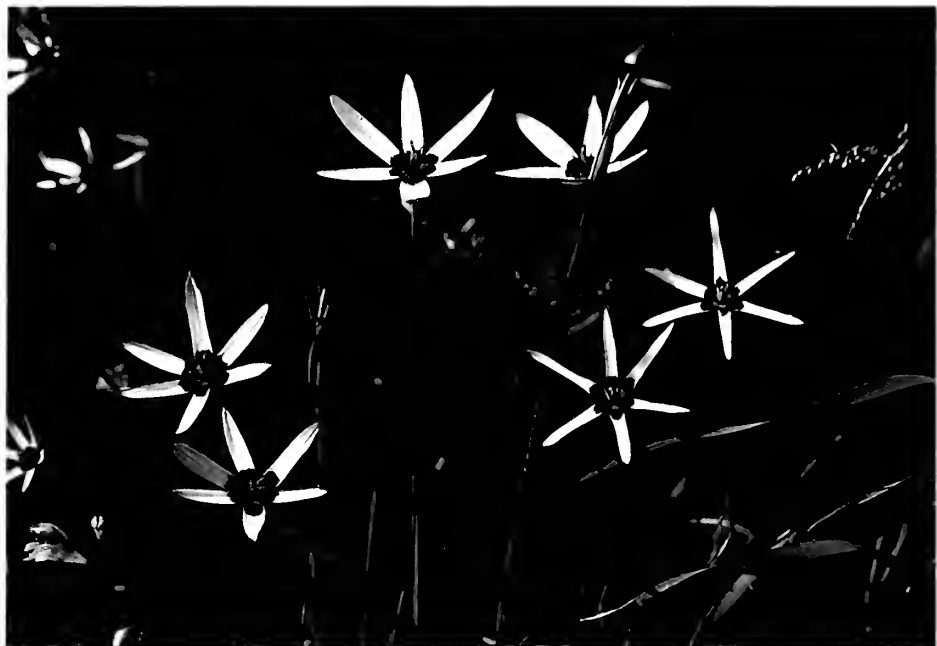
of *Homeria*, *Oxalis*, *Babiana* (some with wonderfully fragrant flowers), *Watsonia*, *Sparaxis*, *Ixia* and *Tritonia*. These all thrive in our heavy clay, and most have survived the severe winters that occur in the Berkeley garden at least once a decade. Fortunately, the South Africans have published a remarkably fine assortment of beautifully illustrated books on their native bulbous plants. It is impossible to describe the variety of floral form, the range of colors, the odd shapes, sizes, spottedness or wartiness of leaves, and the occasional intense fragrance of these plants. The scent of *Freesia* pales compared with the intensity of fragrance of *Gladiolus tenellus*, and a peacock would fold his tail in shame when confronted with the iridescence of *Moraea villosa*. There are many bulbous treasures in South Africa, most of them easy to grow, and in time I hope a wider selection of these will be readily available at moderate prices.



Lachenalia bulbifera.



Romulea tabularis.



Spiloxene capensis.



Sparaxis elegans.

TENDER BULBS FOR SOUTHERN GARDENS

BY EDITH R. EDDLEMAN

Gardens in the middle South need never be without bloom from bulbs. We are fortunate in being able to grow bulbs familiar to Northern gardeners which need winter chilling, such as tulips, narcissus, crocus and snowdrops. Yet our gardens are warm enough for dahlias, crinums, cannas, amaryllis, calla lilies, *Zephyranthes*, gladiolus and elephant ears. Here in central North Carolina (USDA reclassification Zone 7), winter temperatures dip occasionally to 0 degrees F or below, with summer maximum typically 95 to 100 degrees. Average rainfall is about 42 to 45 inches, but summers can be dry.

Crinum

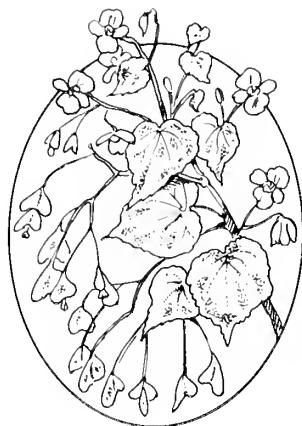
This species has an exotic and tropical look, and combines magnificently in the garden with other plants of tropical appearance. In my own garden, in partial shade, white-flowered crinums grow beside a lovely old bronze-leaved *Canna*. When late afternoon sunlight strikes this planting at an angle, the vein patterns of the canna

leaves stand out like ruby feathers, a stunning backdrop for the backlit snowy *Crinum* petals. Weaving between these two is a giant fern from central Florida, *Hypolepis repens*.

In general, crinums perform best in moist soils, and I have even seen them planted below the surface in the edge of a pond. However, they are adaptable and do well in my dry sandy soil, flowering from late spring to Thanksgiving, depending on the species. I top dress them with composted manure and leaves in fall. The moment temperatures warm, the foliage starts to grow, so they generally have frost-burned leaf tips. A healthy clump of bulbs may produce foliage five feet across.

From early June through July, *Crinum* 'Cecil Houdyshel' produces a sequence of stalks, each bearing several pale pink, narrow, funnel-shaped flowers. In my garden, the magenta flowers and palmate leaves of *Callirhoe involucrata* spread around its feet. In the Perennial Border at the North Carolina State University Arboretum (NCSUA), this *Crinum* complements the pink, silver and purple mottled foliage of *Berberis thunbergii* 'Rose Glow' and masses of feathery silver *Artemisia* 'Powis Castle'. Elsewhere in the border, it is backed by

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Begonia grandis.

the velvety silver-green foliage of pink fall-flowering *Hibiscus grandiflorus*, against a background of 14-foot-tall silver plumed *Miscanthus floridulus*.

The raspberry-pink flaring trumpets of *Crinum* 'Ellen Bosquant' open from deep burnished ruby buds. It is planted in the NCSU border with *Monarda didyma* 'Mahogany' (whose flowers exactly match the *Crinum* bud color), silver-blue flowered *Eryngium alpinum* and moonlight yellow *Achillea taygetea*. In my own garden 'Ellen Bosquant' is surrounded by a taller *Monarda* (whose raspberry-colored blooms exactly match the open flowers of the *Crinum*), interspersed with rounded blue flower clusters of *Agapanthus praecox* ssp. *orientalis*. These are seen through a magenta haze — the flowers of *Callirhoe digitata* which appear to float in the foreground. The *Agapanthus* are flowering well for the first time since they were planted six years ago. I attribute this to two wet springs in succession — and a top dressing of rotted manure the second spring.

I do not know the name of my favorite milk-and-wine *Crinum*, but resembles *Crinum bulbispermum* and the selection 'Gulf Pride'. It came from a friend's mother's garden in Asheville (in the North

Carolina mountains). One of the hardiest crinums I know, this plant survived an overnight dip to -16 degrees F both in Asheville and in Knoxville, Tennessee. The flowers are broad white trumpets with a generous band of soft pink along the keel of each petal. I thought I'd killed a bulb left over winter in a pot. It felt mushy so I composted it. The bulb recovered and grew lustily. It now spends its winters on a Connecticut windowsill.

A bigeneric cross of *Amaryllis belladonna* and *Crinum moorei*, x *Crinodonna*, (formerly x *Amarcrinum howardii*), flowers from late summer through fall. Its arching pleated green leaves and large size — three feet by three feet — recall the *Crinum* parent, while the soft pink, flaring flowers are reminiscent of the *Amaryllis*. In the garden I grow it with *Salvia* x 'Indigo Spires', whose loose flower spikes contrast dramatically with the bold foliage and flowers of x *Crinodonna*. These companions are planted against a backdrop of white-flowered *Lespedeza japonica* and *Boltonia asteroides* 'Pink Beauty'.

Canna

Southern gardeners are lucky enough to be able to leave cannas, elephant ears and



LEFT: *Lycoris radiata* above bracken.

ABOVE: *Lycoris squamigera* and *Phlox paniculata*.

dahlias in the ground over the winter. Rich soil and moisture suit cannas to perfection. So grown, they will reward the gardener with lush foliage and lots of flowers. Adaptable cannas also grow in shade, where they make magnificent foliage plants.



RIGHT: *Lycoris squamigera* above the large, glaucous leaves of *Hosta sieboldiana*.



In addition to the old fashioned small-flowered bronze leaved canna, many other cannas claim the attention of garden makers. Sturdy *Canna* 'Wyoming' has broad bronze leaves and glowing orange flowers (described by a colleague

as looking like silk handkerchiefs tucked into shirt pockets). Taller, with bronze leaves and small red flowers, is 'King Humbert'. Growing to 14 feet tall, with huge slightly glaucous green leaves and small pale orange blooms, is *Canna* x 'Omega'. It grows in damp soil, combined with gold-banded *Miscanthus sinensis* 'Strictus', huge green *Hosta* 'Pie Crust', elephant ears (*Colocasia esculenta*), the tall fern *Hypolepis repens* and a myriad of other plants in NCSUA border Curator Doug Ruhren's garden.

A handsome new canna, 'Pretoria', has broad green leaves veined in gold, with each leaf outlined in red. Its sturdy stems are purple, topped by flowers the color of apricot jam. While it has been combined in a variety of ways in the garden, my favorite combination is in the garden of the friend, who grows it in front of a golden thread-leaved *Chamaecyparis*, at its feet a late-flowering *Kniphofia* with spiky foliage and orange flowers of the same hue as the canna's. Another canna with green and yellow striped leaves is *C.* 'Nirvana'. It grows three feet tall and has bright yellow flowers which fade in full sun (as does the striping of the leaves).

Planted by the thousands along our roadsides in North Carolina is another fine canna, 'The President'. Masses of these three-foot tall plants with emerald green leaves and large red flowers make a fine summer display. In the NCSUA border, this canna combines well with October-flowering *Helianthus angustifolius*, tall blue *Salvia guaranitica* and the palmate foliage of bronze-leaved castor beans. In general, the large leaves and bright flowers of cannas make a bold statement in the garden. They can be used with great effect with other bold-foliaged plants, or contrasted even more dramatically with fine-textured

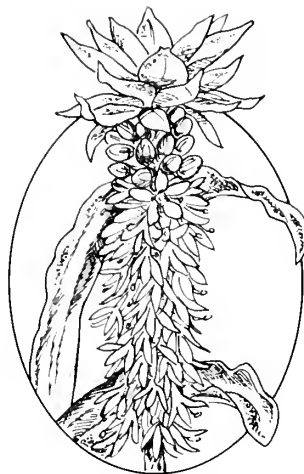
plants such as ornamental grasses, ferns or the feathery fennel or annual dill.

Ranunculus

The heart-shaped, silver-marbled leaves of the lesser celandine (*Ranunculus ficaria*) come up in winter, carpeting the ground until the end of May. The flowers of the common type are bright yellow, and begin to bloom in February, with the silvery chalices of *Crocus tomasinianus*. *R. ficaria* has a reputation as a garden thug, but so far has shown no such tendencies in my garden. Along the edge of a path, I grow some of the pale forms: 'Randall's White', 'Primrose', 'Albus' and 'Lemon Queen', mixed with a lavender-blue *Phlox divaricatus*, the buttery yellow flowers of *Primula* x *tomasinii*, and the green and white striped foliage of *Disporum sessile* 'Variegatum'. *Ranunculus ficaria* 'Florepleno' has bright yellow double blooms; 'Major' bears large yellow flowers on tall ten inch stems; 'Aurantiacus' has lovely pale orange flowers and particularly silvery green foliage; 'Collarette' is an anemone-centered yellow. 'Greenpetal' features a double row of twisted green sepals instead of petals, its flower reminiscent of the green rose, *Rosa viridiflora*. 'Brazen Hussy' is the name given by Christopher Lloyd to a bronze-leaved form of *R. ficaria* with brilliant lacquer yellow flowers, which he discovered. This form combines well in the garden with the yellow and red striped *Tulipa clusiana* 'Chrysantha' and golden flowered *Aurinia saxatilis*.

Gladiolus

Gladiolus byzantinus is called "Jacob's Ladder" by some Southern gardeners. The bright glow of its magenta flowers often signals the location of old home sites. I have seen this species growing in old farm fields.



Eucomis bicolor.

Its tall flower sprays are produced in April above fans of dark green foliage. Suitable companions are pink and white early-flowering *Verbena canadensis* and lavender and white *Verbena tenuisecta* and *Phlox pilosa*.

Hippeastrum (Amaryllis)

The large-flowered or "Dutch" *Hippeastrum Amaryllis* hybrids usually grown as pot plants seem perfectly hardy in our climate. I plant the large bulbs just below the soil surface. A fall top dressing of organic matter encourages good flowering the following spring. Flowers appear before the straplike leaves emerge. One of the delights of the Perennial Border in spring is the striking red-orange trumpets of the cultivar 'Basutoland', flowering with bronze-foliaged dahlias and white *Achillea millefolium*. *Hippeastrum x johnsoni* is commonly grown in the open a bit farther south. Someone kindly provided me with three bulbs, which spent the winter in a pot on my windowsill. The flowers are tomato red with a distinctive white star in the center.

Hippeastrum advenum is a delightful fall-blooming amaryllid sold variously as *Amaryllis advena*, *Rhodophiala advena*. In North Carolina, it is known as the oxblood lily, so called for its narrow, red, trumpet-

shaped flowers. German settlers brought it to Texas, where it is called the school-house lily, because it blooms at the start of fall classes. Shiny green leaves follow the flowers, and remain green throughout winter. This bulb is planted in a sandy, sunny spot in my garden. In the lath house of the NCSU Arboretum, it grows in part shade in a raised bed of fine pine bark and gravel to which lime and fertilizer have been added. In six years, a single bulb has become a generous clump. The bold green leaves and fragrant flowers of the August lily *Hosta plantaginea* make a suitable background.

Elizabeth Lawrence liked to grow *Hippeastrum advenum* with the lacy foliage and white flowers of *Asteromoea mongolica* and *Verbena tenuisecta* 'Alba'. In the border dedicated to her at the NCSU Arboretum, the oxblood lily blooms in the shade of *Polygonatum cuspidatum* (which produces feathery sprays of red-bracted flowers at the same time), above a carpet of silvery leaved purple *Sedum* 'Vera Jameson' and purple-leaved *Heuchera* 'Palace Purple'.

Dahlia

Dahlias, bred from plants native to Mexico, do not have to be lifted for the winter in the



ABOVE: *Alstroemeria psittacina*. **AT RIGHT:** *Ipheion uniflorum*.

South. The tuberous roots can be planted fairly deep (six to eight inches) to protect them from winter cold. Dahlias are heavy feeders, growing well in soils with a high organic content. A top dressing of composted manure works well. Regular watering produces the best flowering. One notable selection in the NCSU Perennial Border is the cactus-flowered, light pink *Dahlia* 'Park Princess', two feet tall,

planted with *Aster frikartii*, *Salvia leucantha* and a silvery ground cover of *Potentilla villosa*. In the hot-colored part of my garden, *Dahlia* 'Bishop of Llandaff', with semi-double orange-red flowers and bronze foliage, complements *Hemerocallis* 'Stella d'Oro', *Salvia coccinea*, *Salvia superba* 'May Night', the pink and cream foliage of *Hypericum moserianum* 'Tricolor', bronze fennel, the scarlet and orange flowers of



annual tasselflower (*Emilia javanica*) and gold-banded *Miscanthus sinensis* 'Strictus'.

Eucomis

The pineapple lilies *Eucomis bicolor* and *E. punctata* are exotic in appearance. Broad clumps of leaves give rise to sturdy stems which carry flowers topped with another set of leaves resembling little pineapples. *E. bicolor* generally has green leaves and white flowers, while the foliage of *E. punctata* may be purplish, and the flowers tinted pink. Even a single *Eucomis* makes a striking accent.

Alstroemeria

Parrot lily is the common name for the curious *Alstroemeria psittacina*. Tall stems clothed in whorls of green leaves bear clusters of red-and-green blossoms in early summer. After the flowers fade, elegant seed pods develop. The foliage is evergreen in winter. It prefers partial shade, and its flowers show to advantage against the cream and green variegated foliage of *Euonymus* 'Silver King'. The further south one travels, the weedier this plant is inclined to be.

Arum

I started my horticultural career as a windowsill gardener and greenhouse grower of tropical plants. The first plant to draw me out into the garden was *Arum italicum* (formerly *A. italicum* 'Pictum'), which I saw growing in a raised bed covered with ivy beneath a huge maple in my great-aunt Edith's garden. The bed and the arum had been there for over 60 years. The large arrowhead-shaped leaves marbled in cream enchanted me. They remained through the winter, and when the spring brought the pale-green spathes, I was even more impressed. The spathes were followed by a

green seeds on the spadix, which ripened to orange by late summer. The arums do not like sandy soil, so try planting the tubers in a rich compost mixture. Given good soil and moisture, *Arum italicum* will grow well in either sun or shade.

Elephant Ears

Elephant ears (*Colocasia esculenta*) were favorites in Victorian gardens. Their heart-shaped leaves, reaching two to three feet (or more) in length, on stems up to eight feet tall, have a decidedly tropical appearance. However, here in central North Carolina, they can remain in the ground through the winter. Colocasias grow best in soils rich in organic matter (rotted leaves and manure) kept constantly moist. Elephant ears may be grown in full sun to full shade. Ferns, *Hosta*, cannas, callas, *Crinum* and large ornamental grasses are good companions.

Zantedeschia

Calla lilies (which are not true lilies) do well in Southern gardens. *Zantedeschia aethiopica*, the white calla, is common. It has dark green leaves (sometimes spotted with white) and pure white flowers. *Z. elliottiana* has beautiful arrow-shaped leaves heavily spotted with silver, and butter yellow spathes. It flowers from late spring through early summer. *Zantedeschia rehmannii* gives rise to pink and burgundy spathed selections. The leaves are narrow compared to the above species, and often solid green.

Callas flower well in soils that are moist or well-watered, performing well in sun or in shade. Like elephant ears, they can overwinter in our climate without being lifted.

Ipheion

Ipheion uniflorum, the garlic-scented blue



Zantedeschia aethiopica.

star flower, carpets Southern lawns in spring. Its delicately blue-tinted flowers are veined with purple. The low gray-green foliage dies down quickly after the flowers fade. The selection 'Wisley Blue' has deeper blue flowers, which are the perfect foil to the glaucous broad needle-tipped foliage and chartreuse flowers of *Euphorbia myrsinites*. The English cultivar 'Froye Mill' bears violet colored flowers. A friend of mine has found a form with large pristine white flowers growing in a Virginia lawn.

Zephyranthes

Atamasco lilies (*Zephyranthes*) occur in moist meadows throughout North Carolina. In the western part of the state, they are known by their Indian name "Cul-lowhee." In spring, pink-tinted buds open to upward-facing white trumpets touched with pink. When my mother was a little girl, she transplanted an Atamasco lily, *Zephyranthes atamasco*, into her mother's garden. It grew and bloomed for several years, then vanished. One spring day thirty years later, as Mother was walking in the garden, she saw the Atamasco lily in bloom once more, in the spot where she had planted it. Despite their preference for

moist soils, these bulbs have done well in my sandy soils enriched with compost, where they bloom in spring amid masses of mauve-pink *Phlox pilosa* 'Ozarkiana' and lavender-blue *Phlox divaricata*.

Blooming in August and September is the white-flowered *Zephyranthes candida*. Buds are produced from clumps of narrow evergreen foliage. I came across a dramatic planting as I was driving along the back roads of piedmont North Carolina. Thousands of these bulbs lined a formal walk sweeping from the street to the front door of a large Georgian residence. Viewing this sheet of silver I was reminded that the La Plata river of Argentina gets its name ("the silver river") from the profusion of these small bulbs which line its banks.

Lycoris

In July, gardens are enlivened by the soft pink, flaring trumpets of *Lycoris squamigera*. Its common names, "naked ladies" and "magic lilies," refer to the fact that the scape appears without foliage. (A clump of gray-green broad leaves appears each winter and dies down before summer.) The scapes rise elegantly above the foliage of blue-leaved hostas, or with Japanese painted fern (*Athyrium nippon-*



icum). I love to see their flowers among blue *Agapanthus*, pink and white phlox and the rose-red *Monarda* 'Adam'. This species is remarkably cold hardy. A group of bulbs barely rooted in soil have survived above-ground in my garden for five years.

Less cold hardy is *Lycoris radiata*, known in the South as "spider lily" because of its long, spidery anthers which emerge from the throats of its red flowers. Like its pink cousins, this species flowers (in September) before foliage appears. Tufts of narrow dark-green leaves with a white midrib emerge in winter. The scapes of *L. radiata* look lovely above the filigreed green foliage of *Selaginella involvens*. My grandmother grew red spider lilies at the base of *Nandina domestica*, underplanted with *Vinca minor*. The color of the flowers reflected the red and rust shades in the *Nandina* foliage. At NCSU, *Lycoris radiata*

LEFT: *Hippeastrum advenum*.

BELOW LEFT: *Crinum* sp.

BELOW: *Hedychium coronarium*.

ABOVE RIGHT: *Arum italicum*.

BELOW RIGHT: *Lycoris radiata*.





is planted among clumps of the red-tipped Japanese bloodgrass, *Imperata cylindrica* 'Red Baron'.

Allium

The showy flowers of *Allium* can add interest to any garden. In May the silvery lavender heads of chives (*Allium schoenoprasum*) rise above rounded clumps of edible green foliage, splendid beside the flowers of lavender moss verbena (*Verbena tenuisecta*) and pink *Phlox pilosa*. Bloom continues for about a month. A pink-flowered form of chives (*A. schoenoprasum* 'Forescate') is an excellent companion to *Geranium* 'Russell Pritchard'.

Many showy *Allium* flourish only in Mediterranean climates. One of the best-adapted for North Carolina is *A. sphaerocephalum*, the drumstick allium. Native to Great Britain and Europe, it likes our summer moisture. The foliage reminds me of wild garlic — I have to be careful not to weed these bulbs in spring. A well developed clump produces many oval clusters of red-violet flowers on three-foot stems from late May through June. In a planting with the creamy-pink *Hemerocallis* 'Better Believe It', the red-violet eye of the daylily is enhanced by the similarly colored flowers of the drumstick allium. Or one can plant *A. sphaerocephalum* with silver-leaved *Artemisia* and pink phlox.

Allium flavum flowers in July in North Carolina. The gray-green cylindrical foliage is eight to ten inches high. Clusters of soft-yellow pendulous flowers on 12 foot stems appear for several weeks. Suitable companions are the ground-hugging bronze leaved *Veronica* 'Waterperry', golden marjoram, and purple-leaved *Perilla frutescens* 'Crispa'.

Allium tuberosum, garlic chives, produces clumps of flat-sided flavorful leaves.

From late summer to fall, starry white flower clusters are borne above the foliage on 18-inch stems. These combine well in the garden with late-flowering daylilies, *Gaillardia*, red and purple verbenas and *Sedum* x 'Autumn Joy'.

Allium stellatum, native to the central and eastern U.S., adds a touch of elegance to fall gardens. Its rose-pink flowers are carried on foot-high stems. Plant this species behind the silvery lavender leaves of *Sedum* 'Vera Jameson', in front of pink-flowered *Abelia* x 'Edward Goucher'. *Allium thunbergii* 'Osaka's Form' is less than a foot tall, and flowers in October. The flowers are a deep violet.

Habranthus

"Copper lilies" is an apt name for *Habranthus texanus*. Its slender stem, six to eight inches tall, carries a small, upward-facing flower whose petals are a coppery red-brown on the outside. Inside, the flower is yellow flushed with orange. These plants set seed rapidly; the seeds look like slivers of charcoal.

Begonia

Native to China, *Begonia grandis* is tuberous. From late August through September, sprays of pink flowers (white in the form 'Alba') are produced on two-inch-tall plants — except in my dry sandy garden where the plants are one foot tall. The succulent stems flushed with red at the nodes, and red-haired leaves shaped like angel wings, make this a striking plant even when not in flower. In the South, a fair amount of shade is necessary to the continued well-being of these plants, as they crisp up in the sun. This begonia is an ideal companion for ferns, hostas and *Tricyrtis*. A striking combination is the white-flowered form of *B. grandis* and the deep violet flowers of *Tri-*



Habranthus texanus.

cyrtis hirta 'Sinnome'. The pink-flowered form of this begonia is lovely with the fuzzy blue flowers of *Eupatorium coelestinum*. The bulbils produced at each leaf node can be collected and planted wherever another clump of this fresh autumn flower is desired.

Hedychium

The ginger lily, *Hedychium coronarium*, produces satiny white flowers with a spicy fragrance in the fall. The foliage resembles a dainty canna, and like the canna, the ginger lily grows from a rhizome. Stems four to six feet tall are clothed in medium-green leaves that taper to a point. I have always grown *Hedychium* in full sun. An evergreen hedge behind it seems to give it all the protection it needs. A friend who grows it in her country garden covers the rhizomes with boughs of cedar. It may need more cover farther south. Although reputed to prefer rich soil and frequent watering, *H. coronarium* has been amenable to fairly dry conditions. Like most of the "bulbs" mentioned in this article, ginger lilies benefit from a fall mulch of rich organic matter.

Nerine

Hardest of the nerines, *Nerine bowdenii* is

native to the Cape Province of South Africa. These flower in piedmont North Carolina in late October. Loose umbels of silver pink or hot pink flowers are carried on 15-inch stems. My bulbs put up foliage in summer, before the flowers appear. This *Nerine* makes a valiant attempt to remain evergreen throughout the winter, but its leaves generally freeze to the ground in our climate. I grow the bright pink form against a gray-blue/lavender and silver background planting of *Buddleia* 'Lochinch' and *Aster x frikartii* 'Wonder of Staffa'. A pale pink form grows in front of a *Callicarpa americana*. A pale pink *Aster caroliniana* scrambles through the branches of the *Callicarpa*. A sunny, well drained and protected winter location helps *Nerine bowdenii* foliage to ripen and mature.

Schizostylis

Schizostylis coccinea looks like a dainty gladiolus. Sprays of buds open in October to November, producing rounded satiny red flowers. In its native habitat, this plant grows in wet places, often with its roots in water. It therefore appreciates frequent watering, particularly during the month before it blooms, and during the flowering

period. The cultivar 'Sunrise' has pink flowers; those of 'Viscountess Byng' are a paler pink. Flowers of 'Oregon Sunset' are a coppery color. *Schizostylis* spreads by a thin white rhizomatous rootstock and multiplies fairly quickly.

Southern gardeners who wish to venture beyond the realm of the ordinary need not limit their bulb plantings to these selections. Additional options include such exotics as *Tulbaghia violacea*

("society garlic"), *Crocasmia* (sometimes called *Montbretia*), many species of *Oxalis* and a multitude of other plants which must move indoors during winter farther north.

Many of the bulbs discussed here can be ordered from traditional bulb suppliers or nurseries. Greenhouse catalogs also advertise as house plants a surprising number of bulbs which can overwinter outdoors in Zone 7 and above.



Crinum sp.



CROCUS, NARCISSUS, TULIPS AND LILIES FOR SOUTHERN GARDENS

BY EDITH R. EDDLEMAN

Crocus

In the mid South, crocus begin and end the year. But our extended fall season makes the autumn and early winter crocus particularly delightful.

Unlike most commonly grown crocuses, *Crocus goulmyii* produces foliage and flowers at the same time. Clusters of lavender-pink blooms emerge from the grassy clumps of leaves from September into October. This species was discovered in 1954 in the Balkans by Dr. Goulm, for whom it was named. I planted bulbs of this crocus with divisions of a mauve-pink *Verbena tenuisecta* seedling which occurred by chance in my garden. The lacy foliage of the verbena provides textural contrast, while the color of its flowers repeats that of the crocus.

October brings the blossoms of *Crocus medius*. Its deep blue-violet flowers are set off by fiery orange anthers. Their color is attractive against the silvery winter leaf rosettes of *Lychnis coronaria*.

Elizabeth Lawrence called *Crocus ochroleucus* "a poor wraith," but it always reminds me of glistening pearly drops pushing up out of the cold November soil. In a good year it flowers from mid-November into December. In my garden it is interspersed with spring-flowering *C. chrysanthus* 'Cream Beauty' beneath a large crape myrtle (*Lagerstroemia indica*). I love to see the yellow-throated white flowers with the pale cream and beige mottled bark of the tree.

December is ushered in by the silver-lilac goblets of *Crocus laevigatus* var. *fontenayi*. The three outer perianth segments of

each flower are feathered with deep violet. In a cold icy December, the flower buds hunker down and wait for warmer weather, and may flower all through January. I purchased my bulbs listed as *C. laevigatus* var. *fontaneyi*, but Brian Mathew in *The Crocus* indicates that the varietal name has no botanical validity and should be omitted.

Narcissus

Depending on where one starts, the first or last narcissus to bloom in my garden is the small hybrid hoop-petticoat known as 'Nylon', who usually shakes out her skirts around the eighth of December. In my garden grow several 'Nylon' clones, descended from a batch of seedlings produced in a single cross made by Donald Blanchard. All of the clones I've grown are alike in the pale lemon translucent quality of their petals which quickly fade to a soft cream color. I grow these small narcissus in well drained soil at the south-facing edge of a stone terrace, where the bulbs are allowed to bake in the summer.

When I was a child, the first daffodils of spring in our garden were *Narcissus pseudonarcissus*. We called them "Jonquils," a term many Southerners use to designate all members of the genus *Narcissus*. Usually blooming in February, this species will occasionally unfurl its buds in January if the winter is unusually warm. The foliage is short, blunt-tipped and green. The butter-yellow trumpets are surrounded by paper-thin creamy petals. Some years, the blooms of these *Narcissus* overlap with the dainty blue arching flower sprays of Roman hyacinths (*Hyacinthus orientalis* v. *albulus*).

Dearest to me of all the old narcissus grown in southern gardens is the swan's neck daffodil, *Narcissus moschatatus*. The broad foliage of this daffodil is a glaucous

gray-green in color. The creamy white flower is borne on a 12 to 15 inch stem in early spring. Its petals droop forward toward the long trumpet-shaped cup. My precious bulb came from a garden in Hillsborough, North Carolina, where this variety was growing when a friend and her husband bought the property many years ago. The swan's neck daffodil is not common in commerce, being in my experience slow to increase, but it can often be found in old Southern gardens. My own bulb (now grown to two after four years) is planted in a bed which is quite shaded in summer (though sunny in spring) and dry. Planted near the swan's neck are *Muscari*, the cheerful "blue bottles" of southern gardens. This year I've decided to add to this blue-and-silver color scheme a carpet of blue *Anemone blanda*.

"Campernells" is the common name for *Narcissus x odoratus*. Early in spring, tall stems carry several fragrant yellow single flowers above green foliage that resembles knitting needles. *Narcissus x odoratus* var. *plenus* has double flowers. This fragrant early-blooming daffodil inhabits old Southern gardens. This spring, after many an attempt to acquire it through mail order firms (who always supplied the wrong bulb), I found a row of them growing alongside a narrow dirt road in the country. I leapt from my car, and knocked on the door of the farmhouse. No one was home, but I left a note asking if the owner might like to sell a few daffodils. Happily, the owner called, and now a clump of these precious bulbs resides in my own garden.

"Pheasant-eye" was our name for *Narcissus poeticus* v. *recurvus*, with broad blue-green foliage and tall stems, each bearing a white flower with a short yellow cup rimmed in red. These are planted in my garden beneath a hybrid serviceberry,



Anemone blanda.

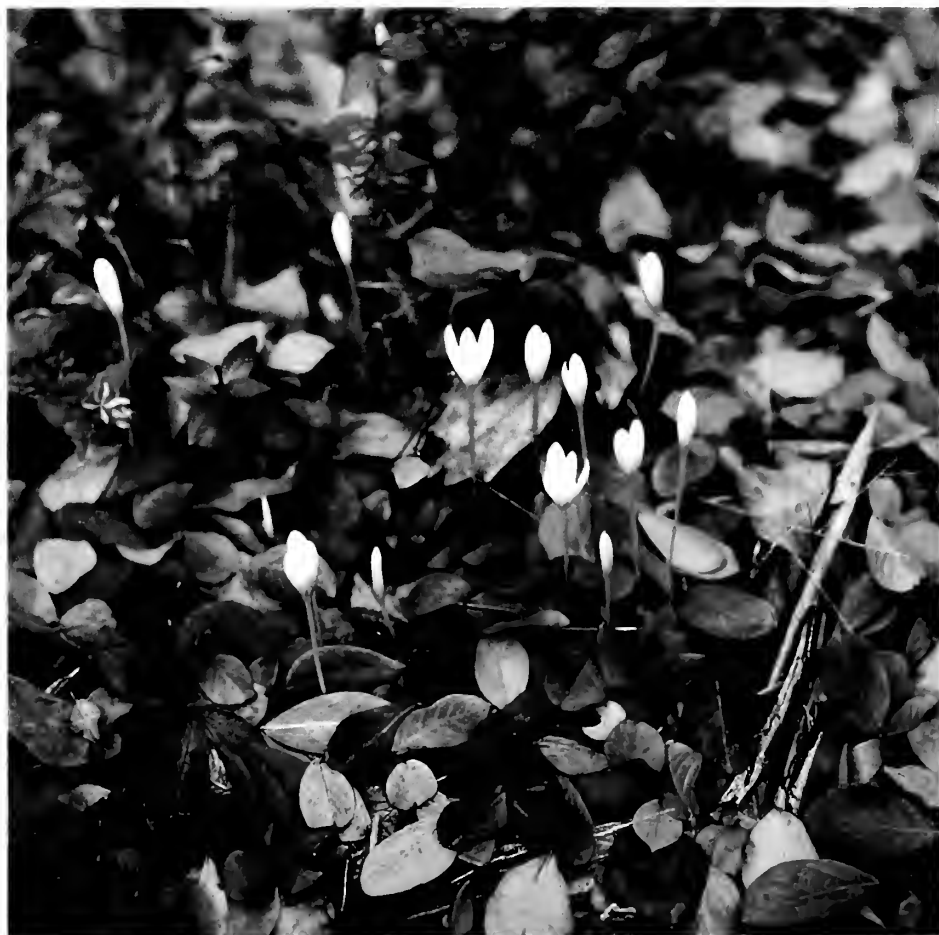
Amelanchier x grandiflora (which flowers heavily every other year), and in front of evergreen *Helleborus foetidus*, with green bell-shaped flowers lipped in red, repeating the red-outlined eye of the *Narcissus*.

"Twin sisters" is the charming Southern name for *Narcissus x medioluteus* (formerly *N. biflorus*). Twin flowers with creamy white petals and short soft yellow cups are borne at the tip of 18 inch stems, above soft gray-green clumps of leaves. In general,

this is the final narcissus of spring, flowering in late April or early May.

Tulips

Southern gardeners are not used to thinking of tulips as permanent residents of the garden, though some old cultivars do persist here. The two tulips which are most successful in my own garden are *Tulipa batalinii* and *T. clusiana*. *T. batalinii* is eight inches tall with pale butter-yellow



PHOTOS BY AUTHOR

Crocus ochroleucus.



Crocus goullymii.

flowers and blue-green recurved leaves with red edges. In a friend's rock garden, I saw it growing amidst clouds of blue phlox, with candytuft (*Iberis sempervirens*), *Anemonella thalictroides*, the foamy white spires of *Tiarella cordifolia* and blue scillas.

The flowers of the lady tulip, *Tulipa clusiana*, are red and white striped like peppermints. (The variety 'Chrysantha' with red and yellow stripes is equally successful.) The 16 inch stems of the lady tulip always look a little lost in my garden, so I offer a planting suggestion from Elizabeth Lawrence, who liked to grow a mass of them edged by clumps of red and white flowered English daisies (*Bellis perennis*), which can be bought as bedding plants in late fall or early spring. White *Oxalis crassipes* would also be an elegant companion.

Lilium

When I started gardening, I was not sure that lilies could be grown in Southern gardens because I had never seen them in my aunt's or grandmother's gardens. Looking back, I believe lilies weren't grown because my relatives gardened in extremely heavy clay soils. I grow many cultivars in the North Carolina State University Arboretum Perennial Border. A part of the secret of their success is planting the bulb tilted at an

angle, so that water drains away from the scales. My favorite lilies are the Asian species and hybrids of *Lilium speciosissimum*. In the 50 percent shade of our lath house and its loose bark planting beds, these bulbs quickly naturalized among the ferns. The sight of hundreds of pink red-freckled lilies nodding above the lacy foliage of the ferns is one I'll never forget. I have also grown this lily in full sun and regular garden soil.

Lilium formosum grows six to eight inches tall, carrying slender cream-white trumpets above stems clothed in whorls of drooping green leaves. The dried seed pods of this species are lovely in flower arrangements. Easily grown from seed, flowering plants can be produced from an early spring sowing. Compact forms of *L. formosum* are offered by at least one nursery.

A Final Note

This is only a sampling of the crocuses, narcissus, lilies, and tulips available to the mid-South gardener. Remember that virtually all of these bulbs (not just the lilies) require good drainage. And many of these bulbs are species rather than varieties. Some may be endangered in their natural habitat. When ordering bulbs, make sure that they are nursery propagated and not collected from the wild.



Lilium speciosum.

THE DRAMA OF BULBS

BY HARLAND J. HAND



Fritillaria imperialis.

The emotional charge that I got as a child from seeing the first leaves of tulips and the lifting little white flower bells of snowdrops in the long-awaited Minnesota spring has never been equaled in all my experiences with plants. As a result I remain charged every time I look at a flowering bulb, especially those of early spring.

Bulbs usually flash their colors, follow with a modest but nourishing growth cycle, then bow out completely for a long rest.

HARLAND J. HAND *is an artist who lives and gardens in El Cerrito, California.*

Because their annual appearances are so abrupt, it is hard to best them for drama. Each new flowering is like the unexpected discovery of long forgotten jewels.

Some bulbs proliferate in my garden. What a delightful surprise to find them in wonderfully unexpected relationships as they spread about or as other plants encroach. And some bulbs are forgotten, overcome by their neighbors or having naturalized into some unwanted relationship.

Many garden-variety bulbs, like most modern garden plants, have become so selected and hybridized that they hardly resemble their original parents. Fortu-

*Crinum.*

nately, some still have at least the feel of their ancestors, so I often go to those ancestors and to their natural habitats to find the special details that can make the "inspired design."

I garden in the San Francisco Bay Area, where summers are dry and winters are wet and usually frost free — very different from the rest of the continent. Because I am an artist, I enjoy solving the resulting garden design problems. I look at all kinds

of plant groupings (bulbs included), especially in the wilderness, to find inspiration and solutions (but never to copy). For this reason, I am not greatly bothered that in my garden snowdrops last only a year or two, and tulips repeat only if they are away from the sprinklers and allowed to stay dry during summer. *Fritillaria imperialis* will not even break dormancy after the mild winter in my area. However, I find numerous bulbs that do wonderfully well here.



Daffodil blooming among azaleas.

Many small, low-growing bulbs flourish in my garden. Seeing them, I think of soaring alpine meadows, rugged rocky outcrops and other places where plants appear either to thrive or struggle, hugging the surfaces so they do not blow or fall away. Creviced granite, grassy hillsides, the sparse scree of mountain and desert or wherever small bulbs naturalize are habitats that inspire me. I have clumps of pink rain lilies (*Zephyranthes grandiflora*) blooming intermittently and unexpectedly in summer, a few at a time, in crevices (the crevices in my garden are two to four inch spaces between the elliptical concrete slabs that, along with coarse gravel, cover the flat areas of my garden). Through a sprawling line of Reiter's thyme, a clump of *Triteleia uniflora* rises horizontally and just tall enough for a show of starry lavender on a bed of the thyme's deep green. The long sprawling leaves of *Muscari armeniacum* grow throughout the year in my garden; their flowers appear intermittently, a few at a time, but in March they turn the crevices blue with bunches of tiny blue-violet balloons atop six inch stems — that was, before my plague of gophers. Petticoat daffodils (*Narcissus bulbocodium*) play drifting games across the garden where the gophers (they don't eat daffodils) have carried them, always to an interesting place (so far). Recently I discovered that I can thwart gophers by building little concrete barriers across the crevices. They are hidden just beneath the surface of the soil, thick and deep enough to block (or redirect) the tunneling that would lead in a direct line from one succulent morsel to another.

Sometimes muscari, petticoat daffodils and the fragrant freesias grow so profusely that they become most pleasant pests. What a puzzling pleasure to decide which

ones to leave and which to remove. A really nice thing about prolific small bulbs is that they can also be used in clumps at the edge of the level areas and at the bases of rocks, small shrubs and perennials, where they form a colorful transitional anchor each spring. This way they also add to the flowing form of my hillside garden, enhancing the naturalistic scene without hiding rocks or other low plants.

Some bulbs thrive under small stones. *Cyclamen persicum* naturalizes by seeding into the coarse gravel. It is touching to see their delicate large pink flowers (the only color that seems to proliferate) force the pebbles aside and take their positions here and there across such ruggedly textured places. The contrast of meek delicacy and rugged strength is always deeply moving.

I am experimenting with the lachenalias. *Lachenalia aloides* (yellow with orange tip) forms large clumps in the crevices, especially if they are kept on the dry side in summer. I am hoping that other species new to me will become good partners for the muscari.

Standing taller than the ground huggers, bulbs such as daffodils, *Sparaxis* and the shorter lilies, when planted close by the taller shrubs and perennials, seem to visually anchor them to the ground. Most shrubs will grow out and over these "anchors" if they are not kept pruned. This can be a disaster if the bulbs are overwhelmed. But flowers peeking out through a shrub are always an amusing surprise. I find that daffodils and some other narcissus will continue in this position indefinitely — neither dying out nor proliferating. My *Sparaxis tricolor* thrive sprawling out from under the edge of shrubs, with their shallow-growing bulbs safely secluded. Their white-centered yellow flowers (other colors are available)

foam out in masses — “flowing” everything together as they float down banks and over rocks. Their masses of flowers bloom for weeks.

Growing between, under and through shrubs or tall perennials is what the tallest lilies seem to especially like. Auratums, regals and rubrums will thrive for years growing through shrubs, their feet in the shade and their flowers exposed above for all — bees, hummingbirds and humans — to see. In the wilds of Mount Shasta, the pale gray-flowered native *Lilium washingtonianum* thrives doing just that. *Lilium parvum* and its wild varieties will grow to huge clumps in the company of our native azalea (*Rhododendron occidentale*) and other shrubs. In the garden, lilies must be fed early in their growing season wherever they are grown with shrubs. Shrubs that share the food must be pruned annually so as not to overwhelm their bulbous companions.

Because they are bulbs of the grassland, especially the Midwestern prairies, turk's cap and many umbel types of lilies usually grow about knee-high. In nature, they bloom when their companion grasses are in flower and they enjoy the partial shade of swaying, wind-blown prairie plants. However, asters and closed gentians grow taller and soon hide the developing seed pods, expanding bulbs and palling leaves of the lilies. Species of goldenrod, *Rudbeckia* and other perennials will grow to over six feet in the climactic color carnival of late summer and fall; by that time the lilies have retired for their annual rest. All the Midwestern prairie growth will be leveled by winter winds and snow. With spring, birds-foot violets and low bulbs start the entire floral display all over again. I grow many of the “knee-high” lilies with low perennials (such as violets), taller

perennials (asters and various daisies) and grasses, including oat grass and clumps of *Festuca*. Someday I would like to experiment with the whole prairie flower sequence.

In the wild, many bulbous plants grow in open spaces within a forest, or at its edge; erythroniums are among the loveliest. Knowing this, I am comfortable placing flowering bulbs near taller shrubs and trees. I also see many bulbous plants growing among the wildflowers and tall grasses of rural fence rows. Since fence rows are a naturalized part of a farm (the farm is the original source of most Western garden ideas), this could very well be where the idea of borders, especially the perennial border, originated. However, the naturalized fence row and the forest edge seem much more earthy, exciting and profound than the traditional, super-refined perennial border.

The thin vertical *Ixia* and the nodding, heavy-bud-tipped *Dierama* inflorescences sway in every breeze. I grow these corms in clumps among succulents, geraniums, low growing perennials and shrubs. Since they behave like grassland plants, I am now trying them among grasses. Occasionally I allow them to grow in crevices for a temporary touch of swaying, wind-wand movement over a flat area, but never in numbers that become a barrier to either eye or foot. Both ixias and dierama are “see through” plants; that is, they have such thin towering lines that the garden beyond them can still be seen — a wonderfully “moving” effect on gently breezy days. The newer ixias (in deep bright pinks and rich reds, or white with surprising touches of blue-green from the rare species *Ixia viridiflora*) are usually very vigorous and grow as tall as dieramas and gladiolus.

Crinum and other bulbs with heavy

flowers and massive foliage perform dramatically as silhouettes against dark shrubs or against an expanse of light sun-drenched color. These plants can be like sculptures in a sculpture garden, except, being plants, they appear quite at home in most gardens.

I don't always fertilize bulbs, but I do (usually in early spring) if they have shown weakening growth and always when they show fewer flowers. I also move bulbs; when they crowd each other, when they are being overcome by other plants or whenever they have ceased responding

well to their garden situation.

When the bulbs begin to go dormant, the garden can seem tired and poorly groomed. The leaves turn from green to yellow to sun-bleached tan. So, where the bulb "debris" is not concealed by other plants, I try to "design in" this season to create a scene of contrasting drama. If the garden has enough dark and light color contrast or enough textures and colors that complement the color of the retiring growth, it will seem a purposeful drama of slumber and wakefulness — instead of a bothersome mess.



JERRI PAVIA

Echeveria elegans with *Sparaxis grandiflora* at right.

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In studies at Longwood Gardens, *Salvia x superba* 'Lubeca', foreground, bloomed for 12 weeks. Behind is *Crocosmia x curtonus* 'Lucifer'.

FOREWORD



ur passion for perennials continues unabated. In the last ten years North American gardeners have expressed enormous enthusiasm for growing herbaceous plants. With our increasingly sophisticated understanding of the art and science of gardening, herbaceous perennials are no longer the “lost chord” of American horticulture.

There is now a strong interest in perennials indigenous to North America. These long-forgotten natives, along with a proliferating number of plants from elsewhere in the world, have expanded our palette beyond all recognition. We are able to create a broad range of horticultural wonders, from cottage gardens and prairies to city rooftops and rock gardens, without having to roam the world looking for those hard-to-find plants. They are now growing in our nurseries and public gardens, and even in our own backyards.

I believe it is the artful wildness of perennial plants that excites us. Perennials enable us to fuse formal design with the natural world. When we garden we create order in an increasingly disordered world, and yet it is the wild profusion of flowers, their colors and scents, their floriferous chaos, that seduces us.

Within these pages is a wealth of information from growers and designers throughout the country. All are enthusiasts, many are obsessive in their passion. These gardeners write of spring in Massachusetts, summer in Georgia and fall in Pennsylvania. They describe plants growing in the Rocky Mountains, the coastal reaches of California and the grasslands of Minnesota. They tell you of the fun of designing borders, the delight of container gardening and the pleasure of ornamental herbs.

I hope that their knowledge and enthusiasm reaches out to you and that you too develop a passion for perennials.

CHRISTOPHER WOODS

GUEST EDITOR

LONG-BLOOMING PERENNIALS

BY DARRELL APPS

Several years ago staff members at Longwood Gardens in Kennett Square, Pennsylvania, became interested in perennials that bloomed over a long period. That interest culminated in a booklet entitled *Perennial Flowers at Longwood Gardens*. The plants observed were growing on the grounds. Each week during the growing season students checked to see whether nearly 250 different plant species and cultivars were in bloom. The data from Longwood is one source of information for this article. A second source is observations I've made in my one and one-quarter acre garden. A third source of information is telephone calls to knowledgeable perennial growers about bloom times of some of the more recent perennial cultivars.

Obviously, length of bloom is only one criterion for judging the best perennials. Certainly, foliage condition throughout the season, freedom from insects and diseases

and adaptability to many soil and climate situations are other important considerations. But color for a long period of time is the most important factor for many consumers.

The rule of thumb is that most perennials bloom for only three weeks. In Zone 7a (6 according to the new USDA Zone Map), where most of this data was collected, the frost-free period is 20 to 22 weeks. Any plant that remains in bloom half of that time (10 to 11 weeks) is a fairly long-blooming perennial. In this article, a long-blooming perennial is defined as one which blooms for 10 weeks or more. These plants were further divided into Best Performers and Good Performers (see the tables that follow). Good Performers are those that bloomed only sparingly or those with short spurts of bloom followed by nonblooming periods.

Color for 10 Weeks

Three years of data collection at Longwood produced some surprises. Some perennials thought to be the best did not bloom as long as suspected, while other less known plants flowered for much longer. One surprise was *Achillea millefolium* 'Fire King'. Originally it was thought that its bloom

DARRELL APPS was Departmental Head of Education at Longwood Gardens from 1975 to 1987. He is a nationally recognized daylily hybridizer. He runs a small mail order daylily business named Woodside and a consulting business, Garden Adventures.

TABLE 1: COLOR FOR 10 WEEKS

Best Performers.....	Weeks.....	Time.....
<i>Achillea millefolium</i> 'Fire King'	15	June-Oct.
<i>Aster x frikartii</i> 'Monch'	14	July-Oct.
<i>Aster x frikartii</i> 'Wonder of Staffa'	14	July-Oct.
<i>Chrysanthemum</i> 'Clara Curtis'	12	July-Sept.
<i>Chrysogonum virginianum</i> 'Mark Viette'	18	Apr.-Sept.
<i>Chrysopsis mariana</i>	10	Aug.-Oct.
<i>Coreopsis grandiflora</i> 'Early Sunrise'	14	June-Sept.
<i>Coreopsis grandiflora</i> 'Sunray'	14	June-Sept.
<i>Coreopsis</i> 'Moonbeam'	15	June-Oct.
<i>Coreopsis verticillata</i> 'Zagreb'	14	June-Oct.
<i>Corydalis lutea</i>	20	Apr.-Oct.
<i>Dicentra eximia</i> 'Alba'	18	May-Oct.
<i>Dicentra x 'Luxuriant'</i>	20	Apr.-Oct.
<i>Gaillardia x grandiflora</i> 'Baby Cole'	14	May-Sept.
<i>Hemerocallis</i> 'Happy Returns'	18	June-Oct.
<i>Hemerocallis</i> 'Stella de Oro'	18	June-Oct.
<i>Kalimeris pinnatifida</i>	14	July-Oct.
<i>Linum austriacum</i>	10	May-Sept.
<i>Lythrum virgatum</i> 'Morden Pink'	10	June-Aug.
<i>Nepeta x faassenii</i> 'Dropmore'	10	May-Sept.
<i>Perovskia</i>	12	July-Sept.
<i>Phlox paniculata</i> 'Eva Cullum'	12	July-Oct.
<i>Phlox paniculata</i> 'Franz Schubert'	12	July-Sept.
<i>Phlox paniculata</i> 'Sandra'	10	July-Sept.
<i>Rudbeckia nitida</i> 'Autumn Glory'	10	July-Sept.
<i>Rudbeckia nitida</i> 'Goldquelle'	11	July-Oct.
<i>Salvia x superba</i> 'Lubeca'	12	June-Sept.
<i>Salvia x superba</i> 'May Night'	12	June-Sept.
<i>Scabiosa</i> 'Butterfly Blue'	18	May-Oct.
<i>Sedum x 'Autumn Joy'</i>	12	Aug.-Oct.
<i>Stokesia laevis</i> 'Bluestone'	14	June-Sept.
<i>Verbena bonariensis</i>	16	June-Oct.
<i>Veronica</i> 'Sunny Border Blue'	14	June-Oct.

Good Performers

<i>Armeria maritima</i>	10	May-Oct.
<i>Aster novae-angliae</i> 'September Ruby'	12	July-Oct.
<i>Chrysopsis villosa</i> 'Golden Sunshine'	10	Aug.-Oct.
<i>Gaura lindheimeri</i>	10	June-Sept.
<i>Geranium sanguineum</i> var. <i>striatum</i>	12	June-Sept.
<i>Lychnis x arkwrightii</i>	10	June-Sept.
<i>Malva alcea</i> 'Fastigiata'	11	June-Sept.
<i>Platycodon grandiflorus</i>	12	July-Sept.
<i>Salvia x superba</i> 'East Friesland'	10	May-Aug.

period was five or six weeks. When regularly dead-headed, blossoming went on strongly for six weeks and then sporadically, for a total bloom period of nearly 15 weeks. Several of the newer beautiful German *Achillea* cultivars do not seem to perform as well as this old standby. Many of the new ones grow too tall on improved garden soils and need staking. *Achillea millefolium* 'Fire King' may need to be staked but seems to be more self-standing than others.

There is little difference between the bloom time of the two cultivars of *Aster x frikartii* observed. Both bloomed for nearly 14 weeks, beginning in early July.

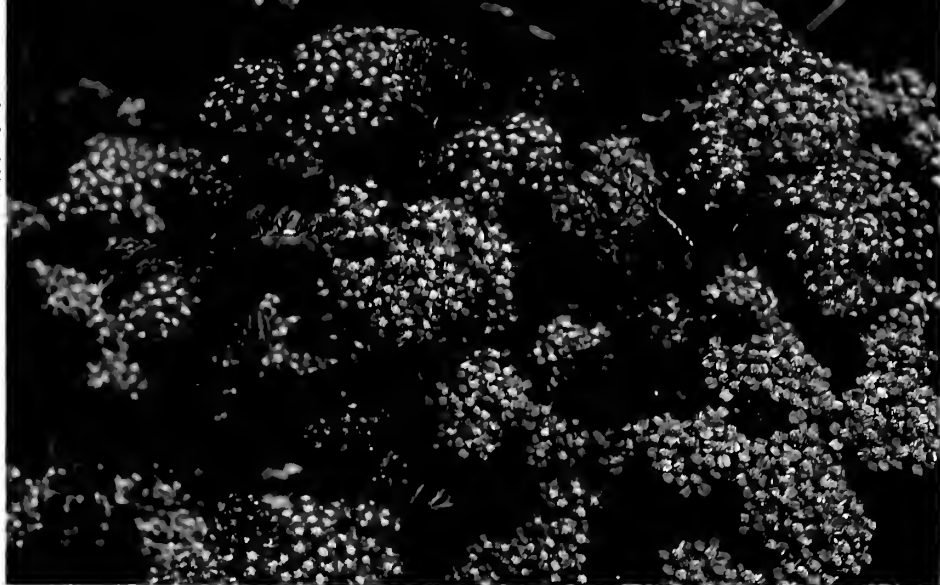
There may be an advantage to growing 'Monch' over 'Wonder of Staffa'. 'Monch' was reintroduced into the United States in the 1980s and has been propagated mainly vegetatively. 'Wonder of Staffa' has been in the market for years and, unfortunately, is sometimes grown from seed. Some seed forms are neither as vigorous nor as hardy as the original cultivar. The only disadvantage to 'Monch' is that it occasionally shows what appears to be a virus symptom. Tissue culture laboratories are now attempting to "clean up" the stock.

A plant observed in my own garden is *Kalimeris pinnatifida* 'Hortensis'. It blooms

TABLE 2: COLOR FOR 6 WEEKS

Best Performers

<i>Achillea</i> x 'Coronation Gold'	7	June-July
<i>Achillea</i> x 'Moonshine'	7	June-July
<i>Anthemis tinctoria</i> 'E.C. Buxton'	9	June-Sept.
<i>Artemisia lactiflora</i>	6	Aug.-Sept.
<i>Aster novae-angliae</i> 'Alma Potschke'	6	Aug.-Oct.
<i>Aster novae-angliae</i> 'Treasure'	8	Aug.-Sept.
<i>Centaurea montana</i>	6	May-Sept.
<i>Centranthus ruber</i> 'Roseus'	9	June-Sept.
<i>Ceratostigma plumbaginoides</i>	6	Aug.-Sept.
<i>Clematis heracleifolia</i> 'Wyevale'	8	July-Sept.
<i>Clematis</i> x <i>eriosstemon</i> 'Hendersonii'	8	May-Sept.
<i>Coreopsis auriculata</i> 'Nana'	6	May-June
<i>Echinacea purpurea</i> 'Bright Star'	8	June-Aug.
<i>Geranium</i> x 'Johnson's Blue'	6	May-July
<i>Heliopsis scabra</i>	9	July-Sept.
<i>Hemerocallis</i> 'Bertie Ferris'	7	June-Aug.
<i>Hemerocallis</i> 'Bridget'	6	July-Aug.
<i>Hemerocallis</i> 'Elizabeth Yancey'	6	July-Aug.
<i>Hemerocallis</i> 'Green Flutter'	6	July-Aug.
<i>Hemerocallis</i> 'Hope Diamond'	6	July-Aug.
<i>Hemerocallis</i> 'Joan Senior'	7	July-Aug.
<i>Hemerocallis</i> 'Offa'	8	July-Aug.
<i>Hemerocallis</i> 'Oriental Ruby'	8	July-Aug.
<i>Hemerocallis</i> 'Pardon Me'	7	July-Aug.



When regularly dead-headed, *Achillea millefolium* 'Fire King', above, bloomed for nearly 15 weeks.

<i>Hemerocallis</i> 'Red Rum'	7	July-Aug.
<i>Hemerocallis</i> 'Shining Beacon'	7	July-Aug.
<i>Lavandula angustifolia</i> 'Munstead'	6	June-Aug.
<i>Oenothera missouriensis</i>	6	June-Aug.
<i>Oenothera tetragona</i> 'Fireworks'	6	May-June
<i>Patrinia scabiosaefolia</i>	7	Aug.-Sept.
<i>Phlox paniculata</i> 'Mount Fuji'	8	July-Sept.
<i>Physostegia virginiana</i> 'Vivid'	8	Sept.-Oct.
<i>Rudbeckia fulgida</i> var. <i>sullivantii</i> 'Goldsturm'	8	July-Sept.
<i>Saponaria officinalis</i> 'Rosea Plena'	6	June-Aug.
<i>Sidalcea malviflora</i> 'Elsie Heugh'	6	June-Aug.
<i>Veronica longifolia</i> 'Icicle'	8	June-Sept.
<i>Veronica longifolia</i> 'Lavender Charm'	8	June-Sept.
<i>Veronica spicata</i> 'Blue Peter'	8	June-Sept.

Good Performers

<i>Achillea ptarmica</i> 'The Pearl'	6	July-Aug.
<i>Aquilegia</i> McKana Hybrids	6	May-June
<i>Campanula carpatica</i>	7	July-Sept.
<i>Echinops ritro</i> 'Taplow Blue'	6	June-July
<i>Gypsophila paniculata</i>	8	June-Aug.
<i>Helianthus x multiflorus</i> 'Flore-plena'	6	July-Sept.
<i>Monarda didyma</i> 'Cambridge Scarlet'	6	June-Aug.
<i>Oenothera speciosa</i>	6	May-June
<i>Salvia azurea</i> var. <i>grandiflora</i>	6	Sept.-Oct.
<i>Tradescantia x andersoniana</i>	6	May-Sept.

for 14 weeks, starting in mid-July. Its fine green foliage is covered with one-inch, double, asterlike flowers. When the flowers age, they dry unobtrusively. There is evidence that it is hardy at least through Zone 6 and perhaps into Zone 5 with protection. The plant spreads somewhat vigorously by underground rhizomes and reaches 40 inches in height. A closely related species, *Kalimeris incisa*, is just starting to appear in wholesale growing operations. It has single daisy flowers but appears to have a shorter bloom time.

A long-time favorite within the chrysanthemum group is *Chrysanthemum zawadskii* var. *latilobum* 'Clara Curtis' (sometimes listed as *Chrysanthemum x rubellum* or more recently *Dendranthema rubella*). It is an extremely hardy plant. Unlike many of the cushion mums it survives most winters. It frequently does need to be dug up and replanted in spring for the best results. 'Clara Curtis' blooms for nearly 12 weeks but often has a slight down time in mid-August. A closely related cultivar, 'Mary Stoker', does not stay in bloom nearly as long. Shortly we will be seeing another plant in this group, 'Pink Procession', with a still-to-be-determined bloom time.

Green and gold, *Chrysogonum virginianum*, is a native American groundcover with many forms. In Zones 5 and 6 *Chrysogonum* blooms most of the summer. A named cultivar, 'Mark Viette', may bloom off and on for up to 18 weeks. In the south, green and gold blooms only in the cooler months of spring and fall.

A plant that barely squeaks into the ten-week category is *Chrysopsis mariana*, Maryland golden aster. It blooms from August to October. Dead-heading is sometimes necessary to make it more presentable. It grows about two to three feet

tall and may be more useful to designers than its taller cousin, *Chrysopsis villosa* 'Golden Sunshine'. It is a long-lived clump-forming perennial.

There are four coreopsis on the ten week list. Two are from the species *C. grandiflora* and two from *C. verticillata*. Generally *C. grandiflora* is not considered a long-lived perennial. It tends to be very successful for two seasons and then needs dividing and replanting. Two cultivars that have been observed are 'Early Sunrise' and 'Sunray'. Both bloom for up to 14 weeks. From a landscape designer's point of view, the threadleaf coreopsis are more useful plants. They tend to survive on the same site for years. But they are not perfect! During the rainy summer of 1989 *C. verticillata* 'Moonbeam', with chartreuse yellow flowers, was slightly longer-blooming than *C. verticillata* 'Zagreb', which has more golden flowers. The foliage of 'Zagreb' is more upright and slightly more handsome than that of 'Moonbeam'. The recently introduced *C. rosea* does not seem to bloom quite as long as the *C. verticillata* cultivars.

Only a few gardeners seem to grow *Corydalis lutea*. It is somewhat fragile and difficult to handle in containers. In the right spot it will bloom nearly the entire summer. It prefers cool, well drained soils and high shade. *Corydalis* seed usually germinates in late winter after being planted for one and a half years.

Bleeding hearts are another somewhat fragile plant group. Two that make the ten week list are *Dicentra eximia* 'Alba' and *D. x 'Luxuriant'*. 'Alba' bloomed for 18 weeks while 'Luxuriant' bloomed 20 weeks. During the heat of summer the blossoms of 'Luxuriant' are faded and not quite as attractive. However, during the cool stretches of spring and summer it is out-

standing. There are several white *D. eximia* cultivars in the trade; some may be better than 'Alba'.

Gaillardia x *grandiflora* is a hybrid with several long-blooming cultivars. 'Baby Cole' is one of the best. Its flowers are a strong bronze-red with yellow tips. The six-inch tall 'Baby Cole' blooms for about 14 weeks. None of the *Gaillardia* cultivars are particularly long lived.

Most daylilies bloom for three to six weeks. Several observed had blossoms for 18 weeks. 'Stella de Oro' was the first daylily to be an almost continuous bloomer in northern states. Its success is unparalleled in this genus. It was registered by the

late Walter Jablonski of Merrillville, Indiana, in 1975, and in a short 15 years became the most popular new daylily worldwide. Coming on its heels are several other long-blooming cultivars. 'Happy Returns' and 'Lemon Lollipop' are very similar to 'Stella de Oro', but in a soft, light yellow color. 'Yellow Lollipop' is a small-flowered rebloomer but in deep gold. All of these bloom for 18 weeks and start to flower about second week of June. A more recent long-blooming introduction is 'Forsyth Lemon Drop', a small-flowered yellow-gold. Because it is an evergreen it may not succeed in the colder hardiness zones.

Most of the blue flax bloom off and on

LONG-SEASON FOLIAGE INTEREST

Alchemilla mollis
Amsonia tabernaemontana
Artemisia ludoviciana var. *albula*
 'Silver King'
Artemisia x 'Powis Castle'
Arundinaria viridistriata
Aster lateriflorus 'Horizontalis'
Baptisia australis
Bergenia cordifolia
Calamagrostis x *acutiflora* 'Stricta'
Carex morrowii 'Aureo-variegata'
Chrysanthemum nipponicum
Chrysanthemum pacificum
Cimicifuga simplex var. *ramosa*
 'Brunnette'
Clematis recta 'Purpurea'
Crocsmia x *curtonus* 'Lucifer'
Elymus racemosus 'Glaucua'
Epimedium x *versicolor* 'Sulphureum'
Eupatorium maculatum 'Gateway'
Festuca ovina var. *glauca*
Hakonechloa macra 'Aureola'
Helleborus orientalis
Heuchera micrantha var. *diversifolia* 'Palace Purple'

Hosta spp.
Iberis sempervirens
Imperata cylindrica var. *rubra*
Iris cristata
Iris sibirica
Iris ensata
Lamium maculatum 'White Nancy'
Liriope muscari 'Variegata'
Macleaya cordata
Miscanthus sinensis 'Strictus'
Molinia caerulea 'Variegata'
Paeonia lactiflora
Pennisetum alopecuroides
Pulmonaria saccharata 'Mrs. Moon'
Sasa palmata
Sasa veitchii
Sedum x 'Ruby Glow'
Sedum hybridum 'Weihenstephaner Gold'
Sedum x 'Vera Jameson'
Stachys byzantina 'Silver Carpet'
Thermopsis caroliniana
Yucca smalliana

for much of the summer but seem to die out over winter. *Linum austriacum* looks much like *L. perenne*, blooms for ten weeks and seems to survive over winter. Its northern hardiness zone is unknown.

All the loosestrifes have been unfairly labeled as noxious weeds because of legislation written specifically banning the genus in certain Midwestern states (curiously, by law, a native prairie perennial in those states, *Lythrum alatum*, could not be sold in commerce). It is true that *L. salicaria* is invasive in wetlands. *L. virgatum*, however, has one cultivar, 'Morden Pink', which is sterile (listed as male sterile, but never seems to set seeds even when surrounded by other species and cultivars). It is an excellent cultivar that begins blooming in June and continues for nearly ten weeks. It is a mainstay of many perennial gardens in the East. *Lythrum* species do fall prey to Japanese beetles.

Catmint has an improved form in *Nepeta x faassenii* 'Dropmore'. This selection reaches 18 inches in height and flowers for ten weeks. Pruning encourages rebloom in August and during fall.

A sort of catch-all phrase these days is the "New American Garden." It is somewhat amusing that many of the plants in these gardens are of foreign origin. A plant often found in the "New American Garden" is from the area of Iran to West Pakistan, hybrid *Perovskia*, Russian sage, (usually labelled as *P. atriplicifolia* and often described as *P. x hybrida* or *P. x superbum*). It is a tough, blue-flowered perennial that prefers full sun and well drained soils. It blooms continuously for 12 weeks, starting in early July. Several related species and cultivars are now beginning to appear in commerce. Some of the newer types may be even better than this hybrid of *P. abrotanoides* and *P. atriplicifolia*.

Phlox paniculata remains one of the most reliable summer-blooming perennials. Many of its cultivars are subject to powdery mildew and other leaf diseases. Thin in spring and divide and replant about every third year. In the data collected at Longwood three were quite long blooming: 'Eva Cullum', 'Franz Schubert' and 'Sandra'. The first is pink, the second lavender and cream and the third an orange-red. All are somewhat mildew resistant in southeast Pennsylvania and bloom for more than ten weeks. Be aware that mildew resistance varies somewhat according to geographical area.

Two coneflowers make the ten week list, *Rudbeckia nitida* 'Autumn Glory' and *R. nitida* 'Goldquelle'. The first is over six feet tall and needs to be staked, and the second stands by itself, but usually needs dead-heading to remove unattractive senescent double flowers. Both are useful landscape plants for large yellow and gold borders.

'Lubeca' is an improved form of *Salvia x superba*. It looks identical to the cultivar 'East Friesland' but blooms about two weeks longer. Removal of the first set of flower spikes usually encourages repeat bloom in the late summer and fall. A closely related plant is *S. x superba* 'May Night'. This plant with dark purple spikes also blooms for over 12 weeks.

A fairly new plant to the United States is *Scabiosa* 'Butterfly Blue' (a trademarked name with U.S. rights now owned by Iverson Perennial Gardens of Chicago, Illinois). This is an unusually good scabious. It is only 15 inches tall and reblooms continuously from May to October. The flowers are a powder blue-lavender.

Stokesia laevis is an American native



Rudbeckia nitida 'Autumn Glory', over six feet tall, needed to be staked but bloomed for ten weeks.

plant with many variable cultivars that seem to do well in many parts of the United States. An outstanding cultivar, 'Bluestone', blooms for 14 weeks. Provide well drained soil and full sun. A very beautiful new cultivar is 'Klaus Jelitto'. Whether it will bloom as long as 'Bluestone' is yet to be determined.

A relatively new perennial to much of the United States is *Verbena bonariensis*. It is a perennial for the warmer zones. It does not always live over in hardiness Zone 7, but reappears each year from volunteer seedlings. It grows nearly 40 inches tall in full sun and blooms nonstop from June to hard frosts in the fall. Those who do not use mulches will find the volunteer

seedlings somewhat invasive.

The final perennial in the ten week list is *Veronica* 'Sunny Border Blue'. For awhile this plant seemed lost to cultivation, but during the last decade it was rediscovered and has reemerged as one of the leading perennials.

The six week list also has some exciting garden plants but cannot be discussed in detail here (see Table 2). Finally, color may be the most important feature of perennials, but knowledgeable gardeners are very much aware of the importance of foliage. The plants in Table 3 are extremely useful for a long season of foliage interest. Beware, however; a few of the selections on this list are quite invasive. ☼

DESIGNING WITH PERENNIALS

BY EDITH R. EDDLEMAN

The best designs develop over a period of time. As a gardener and designer of gardens, I feel that the most valuable tool I have, in addition to my senses, is a shovel. With its help I can erase mistakes and create combinations that satisfy my eye.

As you begin to design a garden, it is important to use all your senses. Consider not only the appearance of the plant, but the perspective from which it is best observed. Does it have soft leaves that would be nice to touch — or is it vicious and prickly but beautiful to look at? Does it smell good or bad? Most important, consider your own feelings about any plant or plant combination, not just conventional wisdom on color and contrast.

Equally important is choosing plants which are suited to the soil conditions and light exposure that prevail in your garden. When selecting candidates for your design, consider where they grow naturally.

EDITH R. EDDLEMAN is curator and designer of the perennial border at North Carolina State University Arboretum in Raleigh. The border features native and exotic perennial combinations. She is a garden designer, horticultural consultant and lecturer.

There are as many approaches to combining plants into designs as there are designers. While there are no hard-and-fast rules, the following suggestions are based on my own experience.

Plant Forms

The profile of a garden is created by the interplay of plant shapes and the angle of view. The perceived shape of a perennial may be dominated by leaves, stems, flowering structures (such as panicles or spikes), the flowers themselves or any combination of these elements. In general, forms or shapes of perennial plants can be classified as: vertical, rounded (or oval) and prostrate (or creeping). Vertical forms often act as architectural elements in the garden, and their positioning is a critical element in layout. Selected specimens of yucca, iris, cardoon (*Cynara cardunculus*), *Lythrum*, hollyhock (*Althea rosea*) or tall ornamental grasses may be brought forward in the garden to create a more natural design with a more complex cross-section.

Plants that are rounded in form include New England asters, gaillardias, *Artemisia* 'Powis Castle', *Sedum* x 'Autumn Joy' and *Achillea millefolium*. Creepers such as *Verbena canadensis* and *V. tenuisecta*, *Gera-*

nium sanguineum, creeping thyme, oregano, *Sedum* x 'Vera Jameson', *Clematis integrifolia* and some *Oenothera*, are useful in melding a combination of plants together to create a fully integrated garden portrait.

The tall but airy plant offers the designer a see-through quality. We are used to thinking of the garden in terms of vertical layers comprised of trees, shrubs and groundcovers, but the garden also has layers from back to front, and see-through plants can enhance this quality of depth. Examples include *Verbena hastata*, *V. bonariensis*, *Patrinia villosa*, *P. scabiosaefolia*, *Callirhoe digitata*, *Linaria purpurea* and its pink form 'Canon J. Went', and grasses such as *Calamagrostis* x *acutiflora* 'Stricta' and *Stipa gigantea*.

Vines can be used either as vertical accents (climbing up posts, trees, trellises and walls), as weavers (trained through shrubs or herbaceous perennials) or as groundcovers.

The form of a plant can be repeated to draw the viewer's eye through the garden, or contrasted with different forms to focus the eye, causing it to pause. Repetition of plant forms, particularly those of similar colors, can be a useful device. For example, several clumps of *Stachys officinalis*, with vertical spikes of red-violet flowers, leading the eye up to a single clump of the taller *Lythrum salicaria* 'Dropmore Purple', reinforce its strong verticality.

The element of time should also be considered. Whatever the length of your growing season, be mindful of the appearance of each garden plant you choose throughout its life cycle. The form of a plant may change over the course of the growing season. For example, when *Baptisia pendula* produces spikes of white flowers in May, it has a vertical form. After flowering, a rounded mass of foliage remains. You

might combine it in the garden with Siberian iris, which is more rounded during flowering than when only the vertical foliage can be seen. Thus the forms of these adjacent plants reverse as the season progresses.

Textures

Plants also have textures which play an important role in design. Plants with fine textures (small foliage and flowers) seem to recede visually, and their use can create a sense of depth and space in the garden. These include narrow-leaved grasses, many ferns, fennel and dill and *Lythrum*. Bold textures, on the other hand, move forward visually and stop the eye. Used alone, in groups or in conjunction with finer textures, plants with large leaves and/or large flowers create a natural focal point. Some examples are *Acanthus* sp., *Bergenia* sp., *Ligularia* sp., *Hosta* sp., *Canna* sp., *Rudbeckia maxima*, *Phlomis russeliana*, *Plantago major* cultivars, *Hibiscus moscheutos* hybrids and *Verbascum* sp.

Through the careful selection of plants with beautifully textured leaves and stems, it is possible to create exquisite garden combinations without flowers. I remember a planting done by a friend which is at its best in winter and early spring here (Zone 7/8) before the weather becomes too hot. In a shady site with moisture-retentive soil, he had combined clumps of green-and-white striped leaves of tuber oat grass (*Arrhenatherum elatius bulbosum* 'Variegatum') with silver-foliaged *Lamium maculatum* 'Beacon Silver' and *Ajuga reptans* 'Grey Lady'. These plants have similarly colored foliage but contrasting texture and form.

I have seen this same gardener combine several plants with yellow-green foliage: shrubby *Phlomis fruticosa*, with its bold,



Vertical forms like *Acanthus mollis*, center, provide an architectural element in the perennial border.



felted leaves, *Verbascum olympicum*, *Stachys lanata* 'Primrose Heron' and the creeping *Marrubium cylleneum* in a composition which is lovely for most of the year. Another eye-arresting combination contrasts the bold foliage of the bronze-leaved *Canna* 'Wyoming' with the feathery thread-like foliage of bronze-leaved fennel (*Foeniculum vulgare* 'Bronze'). Foliage is often more important in garden design than flowers, as its effects are longer lasting.

Color

Just as form and texture can be used in a variety of ways to create effects in the garden, so too can flower and foliage colors be used. The three primary colors are red, yellow and blue. Used together, any two primary colors will cause each other to appear brighter. On the color wheel, the colors located opposite each other are called complementary colors — red/green, blue/orange and yellow/violet. Placing complementary colors side by side in the garden emphasizes the contrast between them, forcing the eye to pause and refocus, thus creating a focal point. For example, the purple flowers of *Clematis x jackmanii* stand out when combined with the yellow-veined leaves of *Lonicera japonica* 'Aureoreticulata', or when trained through the yellow foliage of *Berberis thunbergii* 'Aurea'.

Analogous color combinations combine two primary colors with the color located between them on the color wheel. Red, orange and yellow are one such combination. The use of analogous colors creates a planting in which color changes do not cause the viewer's eye to refocus abruptly. Consider the combination of red *Verbena canadensis*, orange-flowered *Crococsmia x crocosmiflora*, and *Rudbeckia* 'Goldsturm' — or *Gaillardia x grandiflora* 'Burgundy' planted with *Asclepias tuberosa* and *Coreopsis lanceolata* 'Sunray'. The colors them-

selves are bright and exciting, but the overall effect in the garden is one of color harmony and unity.

The warm colors (red, yellow, orange) arrest the viewer's eye, advance visually and appear to shorten space, making it seem smaller. The cool colors (green, blue, violet) recede, creating a sense of distance and depth in the garden.

I consider red to be the swing color of the spectral wheel. In its pure hue, red is a brilliant attention getter. The flowers of *Papaver orientale* 'Goliath' or *Dianthus* 'Crimson Lace' can provide a focal point and a note of excitement when added to a misty composition of pastels. But lighter tints of red (pink) are perceived as cool, especially when combined with violet, blue or green. For example, the soft pink flowers of *Saponaria officinalis* 'Roseo Plena' are restful in combination with lavender *Verbena bonariensis* and red-violet *Salvia x superba* 'East Friesland'.

Green is the most prevalent color in the garden, and comes in every tint and shade imaginable. My current favorite shade of green is chartreuse. Its fresh yellow-green, redolent of spring, is welcome throughout the year for its ability to blend with and spark other colors. I love it combined with pastels to warm them. With hot colors it is a far more effective blender than the white flowers and silver-foliaged plants ordinarily recommended for this purpose.

Most plants available to American gardeners which are described as gray are quite silver in color, and have light-reflective properties similar to those of pure white flowers such as *Boltonia asteroides* 'Snowbank' or shasta daisies. The blue-gray foliage of *Elymus arenarius*, some *Dianthus* and *Ruta graveolens* also reflects light. Leaves or flowers which reflect light can actually brighten other colors in the

garden, instead of integrating them or creating the soothing effect frequently predicted. Applying this principle, it is possible to highlight groupings of pastel flowers, or intensify the impact of brilliant colors, by including plants with silver or



Hosta.

blue foliage or pure white flowers in adjacent plantings.

Vita Sackville-West referred to the happy and satisfying combinations of plants in her garden as "marriages": In the same spirit, dark-foliaged plants can be called the



Aster.

great marriage counselors of garden design. The light-absorbing capacity of dark foliage can successfully meld warring colors, or tone down combinations which offer too much contrast to be comfortable. The ultimate blender of warring colors in the garden, bronze foliage is particularly satisfying where warm colors (such as orange or red) are prominent. A combination which I love features *Asclepias tuberosa* and red *Verbena canadensis* in the foreground, and in the mid-ground *Berberis thunbergii* 'Atropurpurea' and *Curtonus paniculatus*, with its red-orange flower panicles, purple-black stems and deep green pleated foliage. Behind these are clumps of the feathery bronze foliage of copper fennel (*Foeniculum vulgare* 'Bronze'), a *Hibiscus moscheutos* hybrid with large red flowers, *Miscanthus sinensis* 'Silberfeder' with its silver panicles and the bronze-purple foliage of *Canna indica* 'Purpurea'.

All sorts of color schemes are possible. Red and purple gardens are done to great effect in England at Hidcote and on the West Coast. Split complementary color schemes combine a color with one of the colors located beside the complementary color. An example might be a violet and orange garden, where orange is used instead of violet's complementary color yellow.

Be on the lookout for happy accidents which enhance the look of the garden: the forgotten white Dutch iris that makes its appearance above a carpet of the blue flowers and heart-shaped leaves of *Brunnera macrophylla* ... the white field daisy that sprouted next to the blue rue planted at the base of an old-fashioned pink rose... the silvery rabbit tobacco that scattered itself among the violet asters and golden-rods in the autumn garden. Sometimes the effects we do not seek are better than the effects we do.



NOTES ON THE PROPAGATION AND MAINTENANCE OF HERBACEOUS PERENNIALS

BY CHRISTOPHER WOODS

To maintain herbaceous plants you must spend time watering, staking, dead-heading, pinching, fertilizing, mulching, hoeing, digging and preparing for the changes in season. Strangers may tell you that gardening with herbaceous plants can be a low-maintenance operation, but don't believe them! Gardening is hard work; that is part of the pleasure.

CHRISTOPHER WOODS is Executive Director of Chanticleer, a 32-acre private garden in Wayne, Pennsylvania, being developed as a public garden. The garden will open in the near future.

Watering

Watering is necessary whenever something new is planted, when the soil is too dry and plants are stressed, or when plants arrive from a nursery or garden center and must be left in their containers until planting.

The one major rule for watering is to give the plants a thorough soaking at the roots. Watering foliage, either with overhead irrigation systems or by hand, is not only highly wasteful, it may also create a favorable environment for disease. As time consuming as it often is, watering around the base of the plant is the best method.



Mulches provide weed-suppressing cover and reduce water loss. Many perennials require little or no fertilizer. A light application of granular fertilizer in spring and early summer may be beneficial.

The increase in container growing of herbaceous perennials makes it possible to buy plants in pots and plant when it's convenient. Planting can be done at any time of the year as long as the ground is not frozen. Container-grown perennials should be removed from the pot before planting. The potting soil surrounding the roots of the plant should be broken up gently to encourage the roots to grow beyond the container soil and into the natural soil. Failure to do this will often keep the roots restricted, eventually stressing the plant, weakening it and often killing it.



Staking

Staking taller perennials is a time-consuming but essential activity. Stakes can be made of many materials including wood, pea-sticks, metal or plastic. They can be as simple as a single bamboo cane stuck in the ground, or as sophisticated as a series of inter-linked plastic-coated metal stakes. It is important to stake early in the season. It is difficult to gather the tall stems of a plant, wrap them in string and tie them to bamboo canes without the whole plant looking like a badly wrapped gift. Stakes should be placed around the plant after the first flush of growth but before full growth takes place in summer. Stakes should be as unobtrusive as possible.

Fertilizing

Many herbaceous plants require little or no fertilizer. Achilleas, for example, tend to produce fewer flowers and more foliage if the soil is too rich. Peonies and delphiniums, on the other hand, are hungry feeders often needing two or more applications of fertilizer in the growing season.

Use general fertilizers in liquid or granular form carefully. If the soil is fertile and growing conditions are good it may be a complete waste of time and money to apply heavy concentrations of fertilizer. A light application of general granular fertilizer around the plant and scratched into the soil in spring and early summer may be beneficial.

Fertilizers in liquid form applied as foliar sprays make nutrients rapidly available to the plant. Applications of fish emulsion to plants that are clearly in need of extra nitrogen can turn poorly growing plants lush and healthy. The nutrients found in liquid foliar sprays are fast acting, but they do not last long.

Mulching

Mulching with organic material such as salt hay or wood chips not only provides weed-suppressing cover but also shades the soil and helps reduce water loss. Mulching also provides organic material which becomes incorporated into the topsoil. It is important to remember that freshly chipped wood will use up nitrogen as it decomposes, making it unavailable to the plants that need it. Composted or aged wood chips used infrequently as a mulch are beneficial, but soil should be tested every two or three years to see whether the wood chips are significantly altering the acidity or alkalinity of the soil.

Propagation

DIVISION — Most herbaceous plants are easily divided during spring and fall. Break large clumps or crowns into several pieces either with the aid of two garden forks inserted into the clump back to back, with the clump levered apart, or by gently separating the roots with your hands or with a trowel. Discard the older central portions and plant the newer, outer parts.

Plants with fleshy roots such as daylilies can be divided by digging the plant out of the ground and cutting the roots with a knife, or, in the case of a large plant, chopping it into sections with an axe. Be sure that each piece has two to six buds showing signs of upward growth before replanting.

For most herbaceous perennials early spring and early fall are the best times for division. In warmer climates plants can be divided throughout the dormant period.

A number of perennials should be divided only in the spring. Most ornamental grasses prefer to be divided as the temperatures warm toward the summer

months, rather than in the fall when temperatures are dropping.

Container-grown perennials bought in the spring or fall can often be increased by dividing before planting out. If the plant appears overcrowded in its pot, it is likely to be pot-bound and can be divided into two or three separate pieces.

CUTTINGS — Propagating herbaceous perennials by taking softwood cuttings in late spring or mid to late summer can dramatically increase your collection of perennials. The stems used for cuttings should not be so soft that they do not remain erect when cut or so hard that you cannot bend them. With a sharp knife, cut two to four inches below the tip of the shoot. Cut about one-quarter inch below a leaf or pair of leaves (or node). Remove all but the top pair of leaves and insert the cutting to about one-third of its length into a moistened and sterile medium such as one of the many soilless cutting or potting mixtures commercially available.

Cuttings can be easily rooted in a mist bench or in pots covered in clear plastic. Suspend the plastic over the cuttings and open periodically to allow air movement. Once the cutting has rooted, carefully transplant it to a larger pot, grow on and plant out into the garden.

SOWING SEED — Propagating herbaceous perennials by seed is the fastest way to produce large quantities of plants. Although many seeds can remain viable for many years, freshly ripened seed generally provides a higher percentage of germinated seedlings.

Seed flats or pots should have drainage holes in the bottom. If not, punch holes in the base of the container to allow water to drain. Fill the container to one-quarter inch from the rim with a mix of peat or sphagnum moss with perlite or vermiculite

added. Moisten before the seeds are sown, preferably by soaking water up from the bottom. Sow the seed in rows to the depth described on the seed packet. If there are no instructions, a good rule of thumb is that the seed should be covered from one to two times the thickness of the seed. Very fine seed should not be covered but pressed into the surface of the growing medium. Some seeds need light to germinate; these too should be pressed into the surface of the medium. Once the seed is sown, label the flat and wrap it in a plastic bag or cover with a sheet of glass. This ensures that the medium will remain damp enough and not need watering until the seeds have germinated.

Except for seed that germinates in darkness, the seed flat should be placed in a light area but away from direct sun. Temperature requirements for seed germination are highly variable. Often, temperature information is provided on the side of the seed packet. Some seeds need periods of alternating warm and cold temperatures before germinating, while others have hard seed coats that may need to be scratched (scarified) to make the seed permeable to water.

It may take several weeks or even months before germination occurs. Once the seeds have germinated, remove the plastic or glass cover and lightly water the seedlings. When the first pairs of leaves have appeared, light applications of liquid fertilizer are beneficial. After the seedlings have developed two pairs of leaves, transplant them into pots. Water, fertilize and keep them away from strong, direct sunlight. Harden off the young plants gradually once the weather warms. It can take up to two or three years before the young herbaceous perennials are big enough to go out into the garden. ❁

NATIVE PERENNIALS FOR SPRING BLOOM

BY WILLIAM E. BRUMBACK

Native plants have been an integral part of spring gardens since the 1920s when public demand for the eastern woodland species really began. Yet woodland gardens are not the only spring gardens enhanced by natives. Sunny habitats, both wet and dry, are home to an abundance of spring-blooming wildflowers that can be successfully grown in gardens. The trick to growing any plant, especially a native, is to understand the growing conditions in your garden, and then to match the plants to those conditions.

Although wildflowers are spotlighted here, they are best combined with spring-blooming shrubs and other perennials for a complete garden. Spring, for the purposes of this article, is April and May. Please note, however, that blooming times for one area of the country may differ by as much as several weeks from another. Spring in

New England (Zones 4 to 6) comes later than most other areas of the country, and is also probably of shorter duration than more southerly regions. Conversely, although some might consider June in New England to be part of spring, those areas of the country experiencing 90°F. in June probably don't think of June as a spring month. Whatever your definition of spring, be aware that a plant listed for one period of bloom often extends into the following time period, increasing considerably the variety of plants in bloom at any given time.

Early to Mid April

Although some native perennials may appear a bit earlier, the parade of bloom for the woodland garden intensifies in early April with the emergence of the white, six-inch tall Dutchman's breeches (*Dicentra cucullaria*) and the pink-budded (but blue-flowered) Virginia bluebells (*Mertensia virginica*). The growing seasons of both of these species are generally complete by the time the leaves on the trees are fully expanded, and both disappear totally by

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Yellow lady's slipper (*Cypripedium calceolus* var. *pubescens*) and a lavender-blue flowering cultivar of creeping phlox (*Phlox stolonifera*).

the end of June. Known therefore as spring ephemerals, their strategy is to bloom and grow in the short period before the leaves emerge to take advantage of the available light and lack of competition. This growth habit can be used to advantage in gardens by interspersing these ephemeral species with other plants to achieve several blooming periods in the same space.

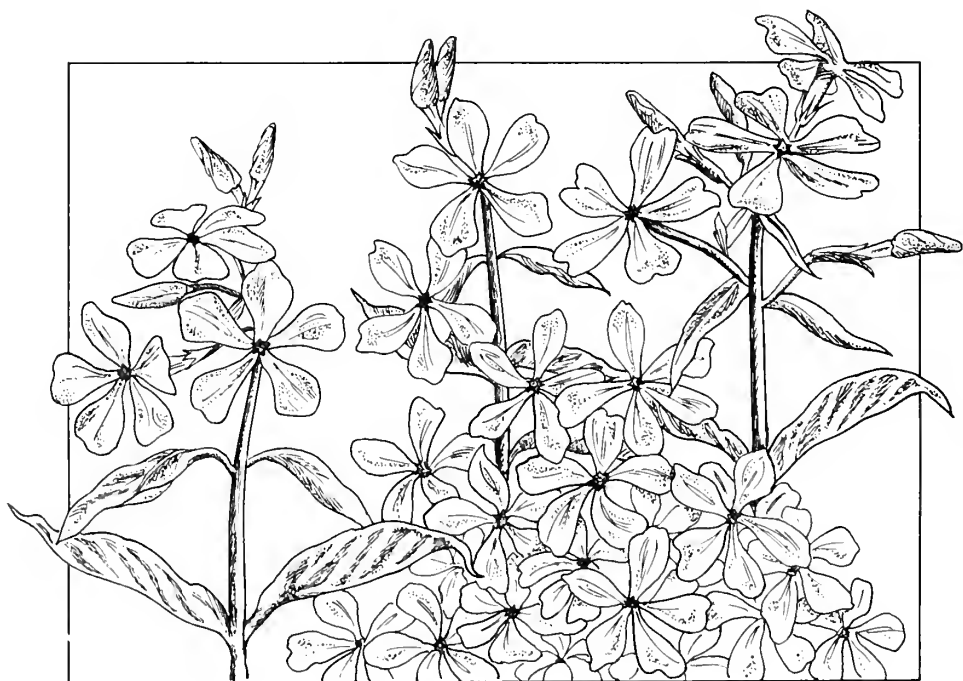
Another early April species, but bearing evergreen leaves, is the bluish-purple (sometimes white) hepatica (*Hepatica acutiloba*). Growing on well-drained, often limestone (circumneutral) soil, this species is sometimes the first to bloom in the woodland garden. However, spring has truly arrived in the garden when the ephemeral trout lily (*Erythronium americanum*) appears with its dwarf yellow trumpets, as well as bloodroot (*Sanguinaria*

canadensis), another denizen of the rich, moist forest with generally short-lived (but very worthwhile) white flowers which appear before the notched foliage has fully emerged.

Early spring would not be complete without trailing arbutus (*Epigaea repens*), an evergreen sub-shrub with fragrant pink flowers for well drained acid soil. But be sure to purchase container-grown plants of this species for best transplanting success.

Mid Through Late April

In the woodland garden the diminutive rue anemone (*Anemonella thalictroides* or *Thalictrum thalictroides*) with white flowers and its variously colored cultivars ('Schoaf's Double Pink' comes to mind) flower at the same time as twinleaf (*Jeffersonia diphylla*, also with white flowers but on one-foot



Phlox divaricata.

stems) and the rare oconee bells (*Shortia galacifolia*). Although the former plants prefer somewhat alkaline soil, the latter species is adapted to acid woodlands and carries pink flowers on six-inch stems above evergreen leaves that redden beautifully in the winter.

Although the woodland is usually where the action is in early spring, there are also several native combinations for sunny areas. Two early-blooming prairie species, the pasque flower (*Anemone nuttalliana*, sometimes known as *patens*), with its purple to maroon flowers appearing before the leaves, and the cleft phlox (*Phlox bifida*), forming an eight-inch tall mat of either blue or white, thrive in well drained soil in full sun. Also best in full sun or light shade, but with a definite preference for wet feet are marsh marigold (*Caltha palustris*) and

the spreading globeflower (*Trollius laxus*). The former species demands moist to wet soil year-round while the latter, a rare species in many parts of the U.S., prefers moist, yet limey soil.

Early May to Mid May

Typically the woodland garden begins to erupt with color at this time. Possible combinations include either the blue wood phlox (*Phlox divaricata*) or one of the many cultivars of creeping phlox (*Phlox stolonifera*) planted with wild bleeding heart (*Dicentra eximia*) whose pink (sometimes white) flowers continue sporadically throughout the summer. The great white trillium (*Trillium grandiflorum*) combined with the delicate foliage of maidenhair fern (*Adiantum pedatum*) and the spectacular large yellow lady's slipper (*Cypripedium*



Trillium.



Virginia bluebells (*Mertensia virginica*) complement the golden-yellow flowers of celandine poppy.

calceolus var. *pubescens*) makes a fantastic show. Either the white-flowered foam-flower (*Tiarella cordifolia*) or the dwarf, blue, crested iris (*Iris cristata*) used as a groundcover with the speckled flowers of fairy-bells (*Disporum maculatum*) or yellow merrybells (*Uvularia grandiflora*) is another of many possible combinations.

Red baneberry (*Actaea rubra*) and doll's eyes (*Actaea pachypoda*) both produce white flowers on one-foot stems in early

May, but their real show comes later in the summer when the berries, colored red or white respectively, add interest to the woodland. In addition, numerous violets appear at this time, including the Canada violet (*Viola canadensis*) with its white petals tinged with purple; the downy yellow violet (*Viola pubescens* var. *eriocarpa*); and the Labrador violet (*Viola labradorica*) with purple flowers and deep green foliage tinged with purple as it emerges in spring.

In sunny areas, the Western native lewisias are beginning their show, and *Lewisia tweedyi*, a temperamental but spectacular specimen, is in full bloom. This species is a candidate for the well drained rock garden, as is the bird-foot violet (*Viola pedata*), the most distinguished of the violets. Also at this time, the myriad selections of the low-growing moss phlox (*Phlox subulata*) are coming into glory. Avoid the typically glaring magenta-colored forms; look for clear whites, pinks and blues that blend more easily with other plants in your garden.

In wet areas the federally endangered swamp pink (*Helonias bullata*) raises its pink drumsticks to two feet. (It's available, but make sure the plants you purchase are propagated, not taken from the wild). This species grows in much the same situation as the Western skunk cabbage (*Lysichiton americanum*), whose huge yellow flowers will make you forget the reason for its common name.

Mid to Late May

At this time spring gardens are in their full glory. Most species listed previously for early May will continue blooming later into the month, turning late May into peak spring bloom. To the woodland plants already mentioned add blue Jacob's ladder (*Polemonium reptans*) in combination with the pendulous white flowers (followed by blue fruits) of the Solomon's seal (*Polygonatum pubescens*) or the terminal white plumes (and red berries) of the false Solomon's seal (*Smilacina racemosa*). Another plant that provides two seasons of interest is the speckled wood lily (*Clintonia umbellulata*). Not as well known as its northern cousin *Clintonia borealis*, this species has white speckled flowers on ten-inch stems above strap-shaped leaves and

produces large black berries in late summer. Green and gold (*Chrysogonum virginianum*), a superb groundcover for sun or light shade, begins its display of yellow daisies in the late spring and continues sporadically throughout the summer.

In cool, moist shade, Jack-in-the-pulpit (*Arisaema triphyllum*) with its striking, hooded flower and bunchberry (*Cornus canadensis*), looking like a four-inch tall dogwood, are both in bloom. Mix in the mat-forming twinflower (*Linnaea borealis*), with its paired pink flowers, and goldthread (*Coptis groenlandica*) with white flowers and small evergreen leaves, for a commonly found boreal association.

In sunny, moist areas the Canada anemone (*Anemone canadensis*) will be blooming in white profusion, but it must be watched or it may overrun a garden. The wild geranium (*Geranium maculatum*), however, is better behaved and produces rosy-purple flowers atop one-foot leaves that disappear in late summer. Also in sun, but in dry, well drained soil conditions, the wild pink (*Silene caroliniana* var. *pennsylvanica*) begins its bloom. Under the same conditions several Western U.S. species add color to the rock garden. Woody-stemmed, clump or mat-forming penstemon species, (*P. cardinalis*, *cardwellii*, *davidsonii* and *rupicola*) add color as do other lewisias (*Lewisia cotyledon* and *columbianum*).

These are just a few of the native perennial possibilities for a spring garden. Remember, however, that commercial collection of native plants from the wild has more than once been the cause of destruction of local populations of wild plants. Whichever species you choose, make sure that your nursery states that the plants in its catalog are *propagated* — not collected from the wild.



HERBACEOUS PERENNIALS FOR CONTAINER GARDENS

BY KEN DRUSE

For ten years, I gardened in a place with winters as cold as Minnesota's and summers when reflected light and radiant heat made it feel like an Arizona desert. Yet, my garden was on the southern boundary of Zone 6 — on a roof in New York City. A hundred plants grew in containers on my roof, and they did quite well.

Even if you can't garden on *terra firma*, you can have gorgeous perennials blooming from spring to fall. You just have to use a little more imagination, and a lot more ingenuity. If you do have an earth-bound garden, it can still be enhanced by some well placed containers.

Years ago, highrise gardeners would

dump soil right on the roof. Years and lawsuits later, we know that *all* plantings must be in containers. They should be located over structural beams or near the edges where walls are the supports. Secure permission from the building's owner. The simplest answer, of course, is "no." But gardening has become so popular that more and more owners are using roof rights as attractions for renting apartments. Just come armed with good information and be prepared to accept liability in the case of any damages. Check the condition of the roof surface and structure first, to be sure that you are not blamed for pre-existing conditions.

What Grows Up

KEN DRUSE is the contributing garden editor of *House Beautiful* magazine. He is the former Editor of *Garden Design* magazine and has written and photographed for countless periodicals and books on the subject of gardening. His most recent book (his fourth) is *The Natural Garden*, Clarkson N. Potter, 1989.

There is a surprising lack of information on this subject. When I began my garden, I tried to find tips on growing herbaceous perennials in planters. I read that you "can't grow peonies in containers," for example, and "don't try *Baptisia* or *Iris*. Give up hope of having wild plants such as *Thermopsis* or *Echinacea*," they said. Well, it turned out

A SELECTION OF HERBACEOUS PERENNIALS TO GROW IN CONTAINERS:

Achillea filipendulina, Yarrow
Baptisia australis, False indigo
Coreopsis spp., Coreopsis
Daucus carota, Queen Anne's lace
Dicentra eximia, Bleeding heart
Echinacea purpurea, Purple coneflower
Eupatorium maculatum, Joe-pye weed
Hemerocallis spp. and hybrids, Daylilies
Iris spp., Iris
Liatris spicata, Gayfeather
Lychnis chalconica, Maltese cross
Lysimachia ciliata, Fringed loosestrife
Lysimachia quadrifolia, Whorled loosestrife
Lythrum salicaria, Purple loosestrife
Monarda didyma, Bee balm
Oenothera biennis, Evening primrose
Paeonia spp. and hybrids, Peony
Phlox carolina, Wedding phlox
Rudbeckia spp., Black-eyed Susan, coneflower
Sedum spectabile and spp., Stonecrop
Solidago spp., Goldenrod
Tanacetum vulgare, Tansy
Thermopsis caroliniana, Thermopsis
Verbascum thapsus, Mullein (biennial)
Veronica spicata, Speedwell



Half whiskey barrels, here planted with geraniums and impatiens, have protective thick, insulating walls.

that these were among my most successful plants. I decided to experiment.

I selected plants that grow in *similar* situations in nature: arid, open fields, prairies and meadows. Plants there have to put up with a lot, especially exposure to weather. Because my roof garden was unprotected on all sides, I had to contend with the wind. My containers dried out every day in August, so like the prairie plants, mine had to be drought tolerant.

The most familiar, tried-and-true perennials have remained popular for years for a

very simple reason — they work. Daylilies grow just about anywhere. And these tough-to-kill perennials were the mainstay of my garden. Siberian iris became solid rhizomatous mats in my containers. When I wanted to move them to a few new places, I had to use a keyhole saw to divide and conquer the clumps.

Growing plants in rooftop containers is quite different from gardening at ground level. Up above, my season was about a month shorter. Trees leafed out two weeks later than the same varieties seven stories



For containers, choose plants that will grow in at least one USDA zone colder than that of your garden.

below, and showed fall color two weeks earlier. Even if container-grown plants are not on a rooftop, they can still freeze in from the sides, up from the bottom or down from the top. Plants have to be hardy. In general, I chose plants that would grow in at least one USDA zone colder than my garden. This holds whether you have perennials in a few containers or an all-container garden on a balcony, rooftop or city backyard.

Plants can be combined to make miniature gardens in pots. But just as in a flower border, it's best not to have lots of tiny polkadots in each planter. Massing works better. You might have one kind of upright herbaceous perennial with a trailing plant such as strawberry or ivy to soften the container's edge. A dreaded invader in the garden such as *Lamium galeobdolon* is terrific cascading over the edge of a container, which will also keep it in bounds. Annuals can be used to fill in while perennials such as goldenrod grow up to flower in autumn.

The Message is the Medium

In a garden, you begin from the ground up; in containers, you begin with the ground itself. I didn't have to improve soil; I had to import it. I used a soilless mix for all my plantings. You can use a commercially prepared medium which contains peat moss, vermiculite or perlite and fertilizer. But for the volume I needed, it was much less expensive to mix my own. I used three parts sphagnum peat moss to one part perlite. I adjusted this ratio, adding more perlite for plants that needed extra drainage, and less for moisture lovers. Some recipes recommend adding ground limestone to neutralize the acidic peat moss, but perlite must be alkaline, for tests revealed that this mix was just

slightly acidic — perfect for most perennials.

This medium weighs about one fifth as much as real garden soil, and holds more water — once it is moistened. It can be difficult to wet peat moss for the first time, or re-wet if it is allowed to dry completely in the container. I think the advice of letting the hose run in the bag for several hours seems like a waste — much of the cold water runs out the bottom of the bag. Warm water is quickly absorbed. Mixing in perlite first seems to help when wetting, too. Wear a mask and goggles if you're blending a good-sized batch: Both peat moss and perlite can irritate eyes and lungs. Use a two-inch layer of coarse, horticultural-grade perlite in the bottom of containers as a lightweight drainage material. Pot shards or gravel will also work. Containers can be mulched with a dressing of coarsely chopped fir bark. Ordinarily, I think this is an unsightly material. But the foliage in the containers quickly covers the surface. Finer mulches might rot, or encourage roots to come up searching for moisture.

These relatively light materials were necessary for my rooftop garden, where weight was a consideration. But even if your containers are destined for a stone patio, you will still want to turn them towards the light occasionally, or move them around. That's one of the best things about these gardens — it's so easy to rearrange the "bed" or "border." You can move blossoming plants into view and take faded ones away.

Choose Your Planters

Containers can be made from a host of materials in unlimited shapes and sizes. Clay pots will crack or spall (except in the South, perhaps). Today, there are wonderful faux-terra cotta pots made of polyvinyl chloride. They are made from molds of

actual clay pots, and dyed to match, so they resemble the real thing. But, they do look a bit “new.” These plastic pots often have a seam from the injection molding process that is a little unsightly, but you can easily remove it with sandpaper. Since they are non-porous and don’t transpire, they won’t develop the character of old clay pots covered with salt deposits and algae. Although they will virtually last a lifetime, they do seem to wear, and after a year or so, their shininess fades and plants obscure the edges. They cost about the same as clay, which seems dear; however, they will last a lifetime. Of course, they are much lighter than clay — another advantage.

You can use ornamental concrete planters such as urns and bowls. But be sure they have drainage holes, as water freezing and expanding can explode almost any rigid material. Drill holes with a carbide bit designed for masonry. Place screen over the holes before you plant to make sure they don’t become clogged. I have a wonderful old urn filled with a mop-top of *Hosta lancifolia* spilling over the edges. It is perfectly hardy and looks great year after year. If you are concerned about a particularly valuable container, but it is too heavy to move to a protected spot for the winter, you can cover it with a bonnet of plastic to keep water out. When the plants are dormant and the soilless medium is somewhat dry, place a bit of straw over the surface and then cover. Be sure to remove this “shower cap” early in the season when all danger of frost is passed.

The best container I’ve found is also widely available, inexpensive and long lasting — and it’s recycled. It’s the half whiskey barrel. These oak kegs are burned inside — charcoaling makes them last even longer — and have thick walls that insulate. They are heavy, though, so a hand truck

became one of my most valuable garden tools. Drill holes, ten or so, in the bottom with a half-inch wood bit fitted in an electric drill. (Here’s an excuse to buy that rechargeable drill, and while you’re at it, add some holes to those plastic containers.)

Any wood can be used to make a planter in any shape or size, but keep in mind that soft woods, such as pine, won’t last long. They rot from constant contact with the moist growing medium. I used some found objects, including half olive barrels made of plastic, and many recycled pine packing crates. I lined the wooden boxes with folded polyethylene film. The plastic film disintegrated wherever it was exposed to ultraviolet light, but held up beautifully under the planting medium. The problem was with the boxes themselves; they rotted from the outside in. I also learned early on that a hodgepodge of containers can make the best plants look messy and the garden fail the aesthetics test.

Untreated redwood and cedar are long lasting but expensive. Although it is tempting to use pressure-treated pine or fir, the preservatives used are poisonous. The few chemicals you can apply yourself that are not poisonous to plants, copper-napthenate and zinc-napthenate, can still be harmful to you (*no* preservatives should ever be used with edibles). Copper-napthenate is green, but the stain fades over time with exposure. Zinc-napthenate is clear, but it doesn’t work as well. You can paint these chemicals on the outside of wooden boxes. Wear gloves and a mask if you use them.

All containers look best elevated. In every case, little “feet” make the planting appear less heavy, less land-locked. But the best reason to raise the containers isn’t for aesthetics; it’s for drainage and air circulation. Water must be allowed to drain away. Wooden containers sitting in water will rot,

and if on a rooftop, the constant moisture will damage the surface. The simplest way to raise containers is to place three or four bricks underneath. To protect my roof and elevate my hundred or so containers, I placed eight-foot-long two-by-fours in a grid with ends pointing towards the roof drains to make channels for rain water. In this case, pressure-treated wood was acceptable, as the chemicals never came in contact with plants.

Planters can also be raised and staged on tiered devices, somewhat like bleachers. This adds a wonderful dimension to the planting. You can create a "mountain" planting raised in the center that you can walk all around, like an island bed. In other places, create a one-sided border planting in which plants step down towards the viewer. These also facilitate reaching into plantings for maintenance.

Care and Feeding

I used to water by hand. That took hours, especially in late summer when plants had filled containers with roots below, and transpiring foliage above. Soon the entire garden was hooked up to an automated drip irrigation system. At first I had trouble finding the materials. I adapted an orchard watering system and lawn sprinkler timers, which I purchased in California. Today, inexpensive drip irrigation materials are available from many mail-order suppliers, and they work very well. You can't use soaker hose. It has to be the drip kind with individual emitters, sometimes called spot-spitters. These attach to capillaries that lead to larger main lines the size of garden hoses. Mine had a wonderful "self-healing" hose so that when you punched a hole and inserted the small tubing, the puncture would shrink and hold the small lines in place. The drip system stayed out through

the winter and lasted for years. You can lay all the pipe easily in an afternoon.

I recommend timers, especially if you're planning a late summer vacation when plants need frequent watering. You can't count on rain, and elevated, pot-bound plants dry out fast. Check timers regularly. Batteries may fail. In the long run, drip irrigation will save time, money and water as it is delivered directly where it's needed.

You will have to feed plants in containers, especially when you use a soilless, homemade medium, which is sterile. Even in the prepared mixes, the plants use up what little nutrition there is rather quickly. I always used a fertilizer that was low in nitrogen, since the last thing I wanted to do was encourage vegetative growth — more plant area to get knocked over in the wind and use precious water. Also, I wanted *flowers* from my perennials, first and foremost. In the old days, I used a 15-30-15 water-soluble fertilizer. Now I've gone organic; there are plenty of natural fertilizers available today to supply nutrients in similar ratios.

I stopped feeding my plants in August because I didn't want to encourage new growth so late in the season. This was especially true for woody plants, but it holds for herbaceous ones as well. Fresh new growth doesn't have time to harden to bear the brunt of winter winds, or in the case of the perennials, become dormant in time to settle in for the winter. I rarely brought in a winter mulch, however. Because air circulation was excellent and there were few disease problems, I left the browned foliage on the plants to act as their own mulch. If I were trying to grow delicate plants of "iffy" hardiness, I might have wrapped the containers in straw and burlap. ❁



For his rooftop garden, the author used wind- and drought-tolerant prairie plants, such as the coneflowers and gayfeathers (*Liatris spicata*) above.

HERBACEOUS PERENNIALS FOR COLD CLIMATES

BY C. COLSTON BURRELL

In the north, successful perennial gardening requires more than a list of hardy plants. It takes knowledge, persistence, patience and a sense of humor. Far from the wastelands pictured by uninitiated gardeners from warmer areas, cold climate gardens support a rich diversity of herbaceous perennials. Some of the most popular and beautiful perennials such as lupines, delphiniums and monkshood luxuriate when freed from the oppressive night temperatures of the mid-Atlantic and Southeastern states.

Northern gardeners face unique challenges. The vagaries of seasonal climatic change seem insurmountable at first. Winter temperatures may drop as low as -45° F while soaring well into the 90's in summer.

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It is often this dry hot summer that is limiting, not the cold winter. However, truly unbearable summer heat is rare, humidity is moderate and night temperatures usually drop to a comfortable level. Areas along the prairie border in USDA Zones 3 and 4 are always warmer in summer than the coniferous forest and Great Lakes areas. Hot dry winds often blow from the west and southwest. Protection from these winds is imperative.

Winter's challenges are also its blessings. Consistently cold temperatures keep the ground frozen, reducing damage from frost heaving. In most years persistent snow cover provides an invaluable blanket of insulation. On the down side, snow cannot always be counted on at the right time or in ample amounts. Frigid winds may blow while temperatures drop into the teens or colder. It is therefore prudent, if not mandatory, to mulch shallow-rooted, tender and evergreen plants as soon as the ground freezes. Despite your best efforts to protect plants, the odd snowless December

will result in a spring trip to the garden center to replace favorite plants killed by deeply frozen ground.

Well known mainstays like peony, *Paeonia*, Siberian iris, *Iris sibirica*, oriental poppy, *Papaver orientale*, and lupine, *Lupinus polyphyllus* and hybrids, are hardy throughout the north to USDA Zone 2. Likewise, the woodland denizens familiar to wildflower enthusiasts are at home in shade gardens of Zone 4 and even Zone 3. These are well covered elsewhere, so I will spare you a lengthy outpouring on their behalf.

Midwestern Natives in the Perennial Garden

One positive upshot of the region's rigorous climate is increased attention to the native flora. Prairie denizens such as blazing stars, coneflowers and queen-of-the-prairie have long been valued for their outstanding ornamental value.

The blazing stars or gayfeathers, *Liatris*, are exceptional for their showy purple to red-violet flower spikes and strong vertical form. I combine them with pale yellow *Achillea* x 'Moonshine' and gray-leaved *Artemisia*. They are natural companions for daisies and coneflowers of all colors. Gayfeathers thrive in full sun and are extremely drought tolerant. The earliest to flower is *L. spicata*. The species form has tall slender spikes to four feet. A popular cultivar, 'Kobold', reaches only two to two-and-one-half feet and has dense, full spikes. Kansas gayfeather, *L. pycnostachya*, is taller, reaching five feet in moist soils. It blooms in July and August. From dry sites comes *L. aspera*, button gayfeather, which has rounded lavender to mauve flower heads spaced evenly along the two- to four-foot stalks in August and September. *Liatris scariosa* is said to resemble *L. aspera*,

but to my eye it is more similar to *L. pycnostachya*. 'September Glory' is a stout, purple-flowered cultivar for late season interest; 'White Spire' is earlier and white-flowered.

Two baptisias, or false indigos, of exceptional garden merit are found on the midwestern prairies. *Baptisia leucantha*, white false indigo, resembles the southern *B. pendula* and is considered by some to belong to the same species. The pea-shaped flowers sit on spear-shaped spikes above blue-gray foliage. Combine white false indigo with sky blue or purple Siberian iris and small-flowered plants such as geraniums. *Baptisia australis*, blue false indigo, is well known to gardeners for its showy flowers and mounds of gray-green foliage. I like to plant them with pink peonies and old-fashioned bleeding heart, *Dicentra spectabilis*.

Other legumes of interest to gardeners are the prairie clovers. *Petalostemon purpureum* has purple cloverlike heads on compact two-foot stems. White-flowered *P. candidum* is more coarse and open. Use them as airy fillers in the June garden. Purple prairie clover combines beautifully with baby's breath, *Gypsophila paniculata* or *repens*, and golden alexanders, *Zizia* sp.

The rattlesnake master, *Eryngium yuccifolium*, has stiff blue-gray foliage and one to three foot stalks bearing open clusters of white ball-like flowers resembling a medieval mace. I plant this architectural gem with purple coneflower, *Echinacea*, culver's root, *Veronicastrum*, and a generous helping of ornamental grasses, native or otherwise. Side oats grama, *Bouteloua curtipendula*, is particularly nice. Other hardy *Eryngium* from Europe and Asia include *E. alpinum*, *E. amethystinum* and *E. planum*. Their showy blue heads are surrounded by metallic blue bracts. All are extremely



Many mainstays of the perennial border, such as the mixed lupines above, are hardy to USDA Zone 2.

drought tolerant once established.

Prairie smoke, *Geum triflorum*, is the best of the geums for midwestern gardens. Drooping dusty-red flowers turn skyward in mid-June to produce silken plumes of pink smoke that fade to silver. Use prairie smoke as a groundcover with Ozark sun-drops, *Oenothera missouriensis*, bloody cranesbill, *Geranium sanguineum*, and pinks, *Dianthus*.

Gray-headed coneflower, *Ratibida columnifera*, is an underutilized daisy with drooping yellow rays and a mounded brown "eye." I prefer its clear yellow flower to the harsh golds of *Rudbeckia*.

The silphiums are a varied group of bold yellow daisies native throughout eastern and central North America. The refined three- to four-foot rosinweed, *Silphium integrifolium*, resembles a sunflower



The purple flower spikes of *Liatris* 'Kobold' combine strikingly with pale yellow *Achillea* x 'Moonshine'.

but blooms from July until September. Compass plant, *S. laciniatum*, sports six-foot stems bearing three-inch yellow flowers throughout July, while prairie dock, *S. terbinthinaceum*, has slender flowering stems from six- to eight-feet tall. Both have beautiful, stiff foliage that make them a must for the roony garden.

Goldenrods are woefully underrated additions to the late summer and fall gar-

den. Recommendations include gray goldenrod, *Solidago nemoralis*, which has one-sided inflorescences with drooping tips. Showy goldenrod, *S. speciosa*, is upright, with rounded, full inflorescences and red-tinged stems. Both prefer dry soils. The largest is stiff goldenrod, *S. rigida*, with flat-topped clusters of butter yellow flowers and soft gray foliage on two- to four-foot stems.

Ironweeds, *Vernonia*, are stately plants

for mid to late-season color. Their intense red-violet flowers are exceptional for the middle or back of the border in combination with switchgrass, *Panicum virgatum*, Joe-pye weed, *Eupatorium*, and sneezeweed, *Helenium autumnale*. *Vernonia fasciculata* is the shortest, reaching two to four feet, while *V. noveboracensis* and *V. altissima* may reach six feet with a four-foot spread. All are hardy in Zone 4.

Culver's root, *Veronicastrum virginicum*, is a superior accent plant for the mid-summer garden. I like to combine the white spires of this plant with the fuzzy pink plumes of queen-of-the-prairie, *Filipendula rubra*. Although drought tolerant, they both prefer a rich, moist soil.

Living on the Edge

Foreground plantings serve as transitions between lawn or paved surfaces and the garden proper. I like plants with loose, open habits that careen into each other and spill over edges, obscuring the straight lines that too often accompany such transitions.

Pinks, *Dianthus*, form tight mounds of spiky gray foliage and have lovely white, red or pink flowers in early summer. They love the alkaline midwestern soil. Allwood pink, *D. x allwoodii*, is the largest, reaching 12 inches in flower. Maiden pink, *D. deltoides*, reaches six to twelve inches in flower and the diminutive alpine pink, *D. alpinus*, forms a low mat three to six inches high.

For early season yellow I use cushion spurge, *Euphorbia polychroma*. The chartreuse bracts are stunning with dicentras, violas and spring bulbs.

The hardy geraniums are an integral part of the summer garden. Bountiful flowers in shades of pink, rose and magenta couple with excellent foliage to make them indispensable. Their forms range from the low spreading *G. sanguineum* to the two-foot

mounds of *G. x magnificum*. Most prefer full sun for best flowering, although they fare well in partial shade. Other good species for Zone 3 and 4 are *G. himalayense*, *G. ibiricum*, *G. maculatum*, *G. 'Johnson's Blue'*, *G. endressii* and *G. macrorrhizum*. Reblooming is not uncommon, especially for *G. 'Claridge Druce'* and *G. sanguineum*. Fall foliage turns rich shades of burgundy and rose.

Three edgers that combine well in the midsummer garden are baby's breath, *Gypsophila repens*, soapwort, *Saponaria 'Max Frei'*, and catmint *Nepeta mussinii 'Blue Wonder'*. The soft pink stars of soapwort work with either white or pink baby's breath, backed with powder-blue catmint. Other hardy plants for the front of the garden include stonecrops with *Sedum x 'Vera Jameson'*, *S. 'Ruby Glow'*, which tops my list, and *Inula ensifolia*, a bright yellow daisy with narrow deep green foliage.

The Middle Ground

The middle of the border usually accommodates the largest variety of plants. Yarrow offers varied color, fine-textured foliage and rounded forms. *Achillea x 'Moonshine'* is as versatile as it is beautiful. The pale gray foliage is lovely all season. The flattened, soft yellow inflorescences set off pink, violet and blue flowers. Balloonflower, *Platycodon grandiflorus*, *Salvia x superba 'East Friesland'*, *Allium senescens glaucum* and *Anthemis tinctoria* have similar growth requirements and give a glorious show in early and midsummer. The 'Galaxy Series' of yarrows are noteworthy and *Achillea filipendulina* types are worth growing despite their potential leaf ailments.

For elegance, try some anemones. They can be blended with almost any plant. For spring bloom, select *Anemone sylvestris*. The white flowers are naturals for adding class to plantings of iris, bleeding heart, columbine

and spring bulbs. For the end of the season try *Anemone tomentosa* 'Robustissima'. The steely pink flowers carry on until frost. I like them with asters and gray-foliaged artemisia.

Coreopsis 'Moonbeam' is nice for the middle or front of the garden. It blooms incessantly, so it can be used to show off pink fleabanes, *Erigeron speciosus*, *Liatris*, obedient plant, *Physostegia virginica*, and garden phlox, *Phlox paniculata*, in midsummer and the slender spikes of veronicas in late summer.

A Commanding Presence

Every garden needs plants with bold texture or majestic stature to add interest and structure to the profile. I have chosen seven favorites that I use when I need a commanding presence.

Boltonia asteroides is a must for the late season garden. The lovely 'Pink Beauty' blooms a full month earlier than 'Snowbank', the bright white cultivar. Both have fine-textured foliage and mounds of small flowers on four-foot plants, a rare combination. Plant them with garden phlox, Joe-pye weed and airy grasses.

Bugbane, *Cimicifuga racemosa*, is equally at home in sun or shade. Spikes five- to six-feet tall erupt in June from a dense mound of attractive foliage. These fuzzy white candelabras add an exclamation point to any garden. A similar effect is obtained with Canadian burnet, *Sanguisorba canadensis*, which blooms in late summer in a moist spot with a cool root run.

Russian globe thistle, *Echinops ritro*, is a favorite of mine. The cold blue flower heads combine beautifully with powder blue *Perovskia* and pale yellow daylilies. All the daisies look good with *Echinops*, especially purple coneflower and shasta daisy. The cultivar 'Veitch's Blue' is the best performer in our wet winter soils. Give the

plants good drainage for best results. Make sure you leave a large spot for the three-and-a-half-foot plants.

Joe-pye weeds, *Eupatorium*, are unsurpassed for their extended interest in the garden. Purple-tinged stems emerge in spring with whorls of deep green leaves that provide vertical foils to mounds of geraniums. When flowering, the large cottony heads in shades of pink and mauve are stunning atop six-foot stems. A favorite grouping includes the underutilized flat-topped aster, *Aster umbellatus*, bee balms, *Monarda*, and New England aster, *Aster novae-angliae*.

Hibiscus are considered southern plants, but selections of *Hibiscus moscheutos* are hardy to at least Zone 4. The showy flowers appear for over a month and the dried seed heads are perfect with grasses.

Patrinia scabiosaefolia is just making its debut in the Upper Midwest. It has proven hardy in Zone 4 and I suspect it will handle Zone 3. The five-foot flowering stems bear airy umbels of yellow flowers. Plant *Patrinia* with *Aster* 'Hella Lacy' for a bright fall combination.

For foliage interest you can't beat the ligularias. Their rounded or triangular leaves are show stoppers in the moist garden. *Ligularia stenocephala* 'The Rocket' is popular, but like most of the species it suffers from interminable wilt in all but the wettest situations. I use *L. przewalskii*, which is similar in appearance and more substantial. Afternoon shade benefits all ligularias, especially *L. dentata*, which has flat-topped flower clusters.

The Shaded Garden

A little shade goes a long way, especially in the hotter areas of Zone 4. I was pleasantly surprised by the variety of plants for the



Compass plant, *Silphium laciniatum*, bears three-inch yellow flowers on six-foot stems throughout July.

shade that proved hardy.

Siberian bugloss, *Brunnera macrophylla*, is a must for the shaded garden. Lovely forget-me-not blue flowers are borne with the daffodils and quickly followed by mounds of gorgeous heart-shaped leaves.

I can't have too much leopard's bane, *Doronicum caucasicum*, in the spring garden. This spidery yellow daisy enlivens groups of lady's mantle, *Alchemilla mollis*, Virginia bluebells, *Mertensia virginica*, bellflower, *Campanula glomeratus*, and ferns.

Coral bells, *Heuchera*, pass both the foliage and flower tests. Plant them in sun or shade. The rich foliage color of *Heuchera* 'Palace Purple' is best in the shade. Jazz things up with bleeding heart,

Dicentra eximia, *Phlox* 'Moody Blue' Jacob's ladder, *Polemonium reptans*, and a blue-leaved hosta such as 'Halcyon'. For a background to such a planting, mix *Astilbe* x *arendsii* cultivars with a variety of ferns.

Variegated and mottled foliage keep things lively. *Pulmonaria saccharata* and *Asarum europaeum* are dependable old timers. *Polygonatum odoratum* 'Variegatum' makes a strong white and green accent. Hostas galore need careful sorting. I like 'Ginkgo Craig', 'Kabitan', 'Louisa', *H. decorata* and 'Frances Williams' to name a few. Other invaluable shade garden denizens are *Actaea* sp., *Aruncus dioicus*, *Bergenia* sp., *Primula auricula* and *Smilacina racemosa*. And the list goes on ... ❁

PHOTO BY AUTHOR



The rounded or triangular leaves of the ligularias are show stoppers in the moist garden. Above: *Ligularia* 'Othello' in bloom.

BLUE COLLAR PLANTS FOR THE SOUTH

BY A.M. ARMITAGE

Growing perennials in the southern states is quite different from growing them in the North — it's more difficult. For the purposes of this article, the South encompasses states below the southern borders of Missouri, Kentucky and West Virginia. This includes an area west to Texas, east to Virginia and south to Florida. Obviously, climate varies significantly in such a large area; there are differences in elevation and rainfall as well as latitude. Asheville, in the mountains of North Carolina, is a different world from Charlotte. Climatically, I designate the South as those areas where night temperatures don't fall below 70° F through the summer, usually from June to September. I do not use USDA Hardiness Zones because they are based on average cold

temperatures, not heat, and tolerance of heat (and humidity) is what blue collar plants for the South are all about. There is absolutely no resemblance between Portland, Oregon, and Atlanta, Georgia, although both are found in USDA Zones 7b-8.

The same species will react differently when planted in the North and the South and southern gardeners can take advantage of these differences. In general, plants flower earlier in the South than the North. While this seems obvious, most garden books still list only Midwestern or Northeastern flowering times. To a transplanted northerner, spring seems to last an eternity in the South compared with the North, so less heat-tolerant spring plants flower longer. Plants that flowered in early May and persisted for four weeks in the North may flower in late February and persist for two months as spring gives way to summer in the South. When I moved south, people

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SELECTED PLANTS FOR THE SOUTH

Plants are listed mainly by species only, but in some cases cultivars may be significantly different. Cultivars of some species are listed if they have been tested and performed well; other species have too extensive a cultivar list to include here (eg. *Astilbe*, *Iris*, *Hemerocallis*, *Hosta*). Plants must be perennial (not biennial or treated as an annual).

WINTER/EARLY SPRING:

<i>Achillea</i> x 'Coronation Gold'	Coronation gold yarrow
<i>Ajuga reptans</i>	Bugle weed
<i>Amsonia tabernaemontana</i>	Blue star flower
<i>Anemone sylvestris</i>	Snowdrop anemone
<i>Aquilegia alpina</i>	Alpine columbine
<i>Aquilegia caerulea</i>	Rocky Mountain columbine
<i>Aquilegia canadensis</i>	Canadian columbine
<i>Baptisia alba</i>	White blue indigo
<i>Baptisia australis</i>	Blue indigo
<i>Dianthus gratianopolitanus</i>	Cheddar pinks
<i>Geranium sanguineum</i>	Bloody cranesbill
'Album', var. <i>striatum</i>	
<i>Geranium</i> spp.	Perennial geraniums
<i>Helleborus foetidus</i>	Stinking hellebore
<i>Helleborus orientalis</i>	Lenten rose
<i>Heuchera americana</i>	American alum root
<i>Heuchera</i> x <i>brizoides</i> 'White Cloud'	Hybrid coral bell
<i>Heuchera</i> 'Palace Purple'	Palace purple heuchera
<i>Iris cristata</i>	Crested iris
<i>Iris pseudacorus</i>	Yellow flag iris
<i>Iris sibirica</i>	Siberian iris
<i>Iris tectorum</i> 'Album'	Japanese roof iris
<i>Lamium maculatum</i> 'White Nancy'	Dead nettle
<i>Oenothera speciosa</i>	Evening primrose
<i>Phlox</i> x 'Moody Blue'	Chattahoochee phlox
<i>Phlox divaricata</i> 'Fuller's White'	Woodland phlox
<i>Phlox subulata</i>	Moss phlox
<i>Thalictrum aquilegifolium</i>	Columbine rue
<i>Tiarella cordifolia</i>	Foamflower
<i>Tiarella cordifolia</i> var. <i>collina</i>	Wherry's foamflower

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SUMMER:

<i>Achillea filipendulina</i>	Fern-leaf yarrow
<i>Artemisia ludoviciana</i> 'Silver King'	White sage
<i>Artemisia</i> 'Powis Castle'	Powis Castle artemisia
<i>Astilbe x arendsii</i>	Astilbe
<i>Astilbe tacquetii</i>	Late flowering astilbe
<i>Belamcanda chinensis</i>	Blackberry lily (Berries in fall)
<i>Canna</i> spp.	Canna lily
<i>Chrysanthemum x superbum</i>	Shasta daisy
<i>Coreopsis grandiflora</i>	Tickseed
<i>Echinacea pallida</i>	Strap coneflower
<i>Echinacea purpurea</i> 'Bright Star'	Purple caneflower
<i>Echinops ritro</i>	Globe thistle
<i>Gaura lindheimeri</i>	Gaura
<i>Iris ensata</i>	Japanese iris
<i>Perovskia atriplicifolia</i>	Russian sage
<i>Phlox maculata</i>	Spatted phlox
'Alpha', 'Omega', 'Miss Lingard'	
<i>Platycodon grandiflorus</i>	Balloon flower
<i>Rudbeckia fulgida</i> var. <i>sullivantii</i>	Yellow coneflower
'Goldsturm'	
<i>Rudbeckia triloba</i>	Three-labeled caneflower
<i>Stachys byzantina</i>	Lamb's ears
<i>Stakesia laevis</i>	Stake's aster
<i>Verbena bonariensis</i>	Brazilian verbena
<i>Verbena tenuisecta</i>	Moss verbena

LATE SUMMER/FALL:

<i>Anemone vitifolia</i> 'Robustissima'	Grape leaf anemone
<i>Aster</i> spp.	Perennial aster
'Alma Patschke', 'Mt. Everest', 'Winston Churchill'	
<i>Baltania astraides</i> 'Snowbank'	Baltania
<i>Helianthus angustifolius</i>	Swamp sunflower
<i>Miscanthus sinensis</i>	Miscanthus grass
'Variegata', 'Zebrinus'	
<i>Salvia elegans</i>	Pineapple sage
<i>Salvia greggii</i>	Cherry sage
<i>Salvia invalucrata</i>	Rose-leaf sage
<i>Salvia leucantha</i>	Velvet sage
<i>Sedum x 'Autumn Jay'</i>	Autumn joy sedum
<i>Tricyrtis farmasana</i>	Farmosa toad-lily



Brazilian verbena (*Verbena bonariensis*),
planted here with petunias, performs well in the South.

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told me I couldn't grow peonies. That turned out to be nonsense. I found that if I selected early to midseason varieties, I had more than enough varieties to choose from for my Athens, Georgia garden.

Plants in the South grow taller as well. The heat generally causes longer, lankier stems, resulting in the need to support plants that usually do not require it. Staking is particularly necessary for summer- and fall-flowering species. To avoid staking, southern gardeners should stay away from tall and giant cultivars. Cultivars labelled as "dwarf" may grow midsize while those listed as medium-tall may provide the

background height provided by tall plants in the North.

Plants grown under high heat and humidity require less fertilization than those grown with cool nights. Most plants do not need large doses of nitrogen and should be fed only in early spring and late summer. Too much nitrogen results in spindly plants which may not flower well.

Plants which flower in the spring do particularly well in southern gardens. In fact, the absence of bitter temperatures often allows for a wider choice of plants than is available for gardeners in the North. Many spring-flowering species need

SPECIES RECOMMENDED FOR THE TEXAS GULF COASTAL PLAIN
(Welsh, 1991):

<i>Achillea millefolium</i>	Common yarrow
<i>Aquilegia chrysantha</i> var. <i>hinckleyana</i>	Hinckley's columbine
<i>Coreopsis grandiflora</i>	Tickseed
<i>Coreopsis lanceolata</i>	Lanceleaf coreopsis
<i>Crinum</i> spp.	Crinum lily
<i>Cuphea micropetala</i>	Cigar plant
<i>Echinacea angustifolia</i>	Purple coneflower
<i>Echinacea purpurea</i>	Purple coneflower
<i>Eupatorium coelestinum</i>	Boneset
<i>Gaillardia</i> x <i>grandiflora</i>	Indian blanket
<i>Hamelia patens</i>	Texas firebush
<i>Heimerocallis</i> spp.	Daylily
<i>Hymenocallis</i> spp.	Spider lily
<i>Malaviscus arboreus</i>	Wax mallow
<i>Penstemon tenuis</i>	Gulf Coast penstemon
<i>Physostegia virginiana</i>	Obedient plant
<i>Plumbago auriculata</i>	Cape leadwort
<i>Ruellia brittoniana</i>	Mexican petunia
<i>Salvia greggii</i>	Cherry sage
<i>Salvia leucantha</i>	Velvet sage
<i>Tagetes lucida</i>	Sweet-scented marigold

only a few weeks of temperatures below 40° F to satisfy their cold requirements, a condition usually found as far south as Tallahassee, Florida. The combination of minimal cold and abundant heat can create wonderful opportunities for some species which southerners have cursed over the years. For example, such northern mainstays as delphiniums, lupines and polyantha primroses, planted in the fall, provide wonderful displays in the spring and early summer. However, they should be treated

as annuals and removed after flowering.

Some of the problems of growing perennials in the South are obvious. Heat is a more insidious hazard to plant growth than cold. Whereas cold kills, heat results in slow torture. In the South marginal plants seldom disappear entirely and often must be removed.

Soil in much of the mid South (known as the Piedmont) is atrocious, breaking shovels and spirits. Heavy clay with particularly poor drainage is the norm, and

SPECIES RECOMMENDED FOR THE ORLANDO, FLORIDA AREA
(Mackey, 1991)*

AND THE TALLAHASSEE, FLORIDA AREA**

Those not followed by an asterisk do well from Tallahassee to Orlando:

<i>Achillea millefolium</i>	Common yarrow
<i>Achillea filipendulina</i>	Fern-leaf yarrow
<i>Agapanthus</i> spp.*	African lily
<i>Amaryllis</i> spp.	Amaryllis
<i>Asclepias tuberosa</i>	Butterfly weed
<i>Justicia brandegeana</i>	Shrimp plant
<i>(Beloperone guttata)</i> *	
<i>Chrysanthemum x superbum</i>	Shasta daisy
<i>Coreopsis grandiflora</i>	Tickseed
<i>Crinum</i> spp.	Crinum lily
<i>Crocasmia masonorum</i> *	Crocasmia
<i>Cuphea hyssopifolia</i>	Mexican heather
<i>Dietes vegeta</i> **	African iris
<i>Echinacea purpurea</i>	Purple coneflower
<i>Euryops pectinatus</i>	Bush daisy
<i>Gaillardia x grandiflora</i>	Blanket flower
<i>Hedychium coronarium</i>	Ginger lily
<i>Hemerocallis</i> spp.	Daylily
<i>Hibiscus coccineus</i>	Scarlet hibiscus
<i>Hibiscus</i> spp.	Hibiscus
<i>Strelitzia reginae</i> **	Bird of paradise
<i>Zingiber officinale</i>	Common ginger
<i>Zingiber zerumbet</i>	Pine cone ginger

must be improved. Winter rains have killed far more perennials in southern gardens than summer heat. Soils south of the Piedmont have the opposite problem; they are generally very sandy and drain quickly. Copious amounts of organic matter must be added to improve water retention and nutrient absorption. Beginning gardeners in the South know they have come of age when thoughts of manure, known as "black gold," bring smiles to their faces.

An extensive amount of information has been gathered over the years from the trial gardens at the University of Georgia in Athens, Georgia, where perennials are tested. Those which have performed well over a two- to three- year period are referred to as "blue collar" plants and are reliable in the mid and deep south. In the upper south, such as areas of North Carolina and Virginia, even more species perform well. Other test areas include my own garden and comments from gardeners and



Phlox maculata, spotted phlox,
can survive the heat and humidity of the South.

landscapers in Atlanta and Augusta. The list of high performance plants for the Panhandle area of Florida on page 51 has been provided by Ms. Suzanne Watkins, who runs Tallahassee Nurseries, in Tallahassee, Florida. She has an eye for good plants, a spirit for experimentation and the discipline to document her successes and failures. I have also consulted articles by Betty Mackey for additional species for the Orlando area and by William Welch for the area around College Station, Texas. Both

essays are found in *Perennials: Toward Continuous Bloom*, edited by Ann Lovejoy, 1991, Capability Books.

Many other perennial species and cultivars could be added, as well as bulbs and fall-planted perennials treated as annuals. The preceding lists contain "blue-collar" plants only. Many more do well and may be found in gardens from Memphis to Mobile. The South is not, and never has been, a perennial wasteland. ☼



The exquisite foliage of *Artemisia ludoviciana* 'Silver King' enhances any perennial border.

PERENNIAL GARDENING IN THE ROCKY MOUNTAIN REGION

BY LAUREN SPRINGER

The gardener moving here from a milder maritime region can easily be disheartened by one look at a hardiness zone map. The zones should be considered broad guidelines, by no means etched in stone. Based on average minimum temperatures, they ignore other significant factors that determine a plant's chance of surviving and thriving. In fact, for herbaceous perennials in this part of the country, the hardiness zones are virtually useless.

The Rocky Mountain region, wracked by extremes of heat, cold, wind and drought, nevertheless offers low humidity, cool summer nights, frequent snows and intense, life-giving sunlight. Without the

typical gray maritime winter and its cold, wet soil, a great number of plants survive surprisingly low temperatures and even retain handsome winter foliage.

In the mountains, traditional border favorites like delphiniums, shasta daisies, lupines and peonies bloom with abandon in richer, deeper colors, unplagued by the diseases often associated with them. Many plants that demand undue attention and coddling elsewhere grow embarrassingly well. The newcomer will meet many a cranky old acquaintance in obscenely good health: huge mounds of the fiery red-flowered *Zauschneria*, *Epilobium* species, yard-wide mats of the tiny silver *Raoulia australis*, overwintering ice-blue *Oxyptalum caeruleum* and on and on. In shady gardens, with mulch and additional water, hellebores, astilbes and hostas thrive along with many favorite Eastern woodlanders.

Water is the limiting factor, much more

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so than average annual minimum temperatures. With a plentiful supply, a good mulch and well enriched soil (organic matter is the most needed amendment; most regional soils are quite fertile and rich in the mineral department) almost any traditional border perennial can be grown with impunity. But water being the emotionally and politically charged issue that it is in the interior West, many forward-thinking people have decided to concentrate on conservation, especially in the garden, where more than half of the average household's supply of the precious commodity is expended during the growing season.

This new and growing sensitivity to prudent water use in the landscape has been labeled xeriscaping. Xeriscaping is simply common sense. Grouping plants by their cultural needs seems obvious; grouping them by their relative thirst is one of the main themes of xeriscaping. Herbaceous perennials, thus far, have been minor players in the movement. Emphasis has been placed on finding alternatives to thirsty lawn grasses and woody plants. But with the parallel passions for native plants, most of which are herbaceous perennials, and for rock gardening — a landscape that finds its most natural expression here — perennials are becoming strong players in the evolving horticultural scene of the Rocky Mountains and High Plains.

Comparing and matching a region's climate with others throughout the world is a good way to come up with an appropriate plant palette. Knowing where a plant developed and what type of conditions prevail there goes a long way toward insuring its success in the garden. A gardener should seek out this information as fervently as information on bloom time, height and flower color.

The Rocky Mountain region shares sim-

ilarities with several regions: the sunny, dry Mediterranean, the origin of many much-loved garden perennials; the higher elevations of South Africa, where a number of beautiful perennials, especially bulbous species, originate; and the steppes and mountains of the eastern Mediterranean countries and Central Asia.

It is these latter regions that hold the most promise. In climate, they are almost exact twins to the Continental West. Their herbaceous flora is one of the richest yet least known of any in the world. The land is rugged and sparsely populated — all factors which have made the untold horticultural treasures waiting there all the more tantalizing. Slowly, some of these beautiful plants are being discovered, grown and made available to the gardener, thanks to a few intrepid plant collectors and growers.

With the choice of perennials increasing all the time, it's becoming easier to choose plants that require the least amount of effort, chemical or cultural. Whether the garden is formal, casual and cottagey, or naturalistic, the perennials that follow offer a sampling of the wide choice available to gardeners living in the Rocky Mountain region, a land of extremes.

Native Perennials

Plants native to the montane region, the foothills or the plains are the first place to look for perennials. Every year, local nurseries are making several new species available to home gardeners.

In a sunny garden with little additional irrigation, if any, and perhaps a bit of soil cultivation — certainly not the tons of manure and compost that traditional border perennials require — native perennials can create bright, carefree splashes of color from spring until fall. The following are a smattering of some of the showier

and more tractable native species for the garden:

Penstemon nitidus: May, brilliant true-blue spikes, 1', a reliably perennial member of this genus.

Penstemon virens (blue-mist penstemon): June, ethereal sky blue flowers, 6-10", another long-lived plant.

Penstemon pinifolius (prairie fire): blooms on and off all summer, fiery red, with needlelike evergreen foliage, 8-18", long-lived. A creamy yellow sport is available.

Penstemon strictus (Rocky Mountain penstemon): June, strong spikes of deep indigo, 2-3', tolerates heavier watering as well as drought.

For contrast with the blue penstemons:

Eriogonum umbellatum (sulphur flower): blooms most of the summer, showy yellow umbels, evergreen leathery whorls of leaves turning burgundy in winter, 6-12".

For a midsummer symphony of blue and yellow, combine:

Linum perenne spp. *lewisii* (blue flax): blooms all summer, sky-blue airy flowers, 1-2'.

Thelesperma filifolium (greenthread): blooms all summer, yellow daisies reminiscent of garden coreopsis, 1-2'.

For added vibrancy:

Gaillardia aristata (Indian blanket): blooms summer until mid-autumn, large red and gold, boldly patterned daisies, 1-2'. Cultivars of varying height and in solid colors — yellow or deep red — are available.

For a pink, rose and white scheme that blooms all summer:

Callirhoe involucrata (prairie winecup): large rose flowers over a rambling mat of foliage, 6-12", much wider than tall.

Gaura lindheimeri (apple blossom grass): airy spikes of white flowers, 1-2'.

Mirabilis multiflora (showy four-o'clock): purple-red flowers, gray-green shrub-like mound of foliage, 1-1/2-2'.

Ipomoea leptophylla (bush morning glory): large funnel-shaped pink flowers, narrow willowlike foliage, arching, graceful habit, 1-4'.

Oenothera caespitosa (white evening primrose): large white flowers open in late afternoon and close the next morning, fuzzy gray foliage rosette, 4-10".

Melampodium leucanthum (white paper flower): white flowers like a cross between a daisy and a zinnia, 4-12".

For fall color:

Helianthus maximiliani: September/October, golden daisies cling closely up and down a tall stem, 3-6'.

Liatris punctata (prairie gayfeather, blazing star): August/September, showy rose-purple spikes, 1-2'.

Haplopappus spinulosus: August-October, golden asterlike flowers in great numbers over gray-green foliage, 1-2'.

Many perennials native to other parts of North America also thrive in the Rocky Mountain region, especially ones from the adjacent grasslands of the Midwest. Three easy and rewarding beauties to combine for a dry, sunny spot, all of which attract butterflies, are:

Amorpha canescens (lead plant): July-August, purple-blue spikes cover soft gray foliage, shrubby, 2-4'.

Asclepias tuberosa (butterfly weed): July-August, orange (rarely red or yellow) flower clusters, 1-2'.

Echinacea purpurea: (purple coneflower): blooms summer into fall, rose-pink daisies with rich orange centers, 2-3'.

For a sunny, low-maintenance garden



Many plants that demand undue attention elsewhere, such as the fiery, red-flowered *Zauschneria arizonica*, thrive in the Rockies.

that needs only one watering a week, tough yet beautiful garden favorites like *Dictamnus albus* (gasplant), *Campanula glomerata* (clustered bellflower), *Achillea filipendulina* and hybrids (yarrow), *Echinops ritro* (globe thistle), *Coreopsis verticillata*, *Centaurea macrocephala* (golden knapweed) and *Sedum* x 'Autumn Joy' will give the lazy gardener a summer and fall of colorful pleasure.

Old World Standards

Many well known sun-loving, drought-tolerant perennials from the Old World can be grown to perfection here. The best gardens

have combined these with some of the newer, more unusual introductions. Small plants that suit both the rock garden and the more traditional herbaceous border abound: Spring brings a froth of white candytuft, *Iberis sempervirens*, and basket-of-gold, *Aurinia saxatilis*. The blue evergreen donkey-tails of *Euphorbia myrsinites* sprout chartreuse flower clusters. Two newer garden introductions, both low evergreen groundcovers and both covered in blue flowers in the spring, make great companions: *Veronica pectinata* and *V. liwanensis*.

A little South African perennial of fortitude and boundless energy (in other

words, invasive yet lovable) is the hardy iceplant, *Delosperma nubigenum*. Fleshy light-green foliage mats creep merrily along; in winter, they turn raspberry red. Yellow daisies cover the two-inch tall plants in May, and look wonderful with the blue veronicas. A horticultural battle between the groundcovers may ensue, but both are shallow-rooted and easy to control. New species of iceplant are coming into cultivation all the time, in many colors, and there will be a whole group of hardy ones for the gardener to choose from soon.

As spring overlaps with summer, the cheerful sunroses, *Helianthemum nummularium* and other species, begin their month or so of bloom. The gray-leaved varieties are markedly more heat- and drought-tolerant than the green ones. The ever-silver foliage perennial *Tanacetum densum* var. *amani*, partridge feather, might add a cool note to the riot of color. *Dianthus* species start their summer display, and in the taller parts of the garden, *Asphodeline lutea*, *Asphodelus albus* and *Eremurus* species and hybrids send up elegant spires in yellow, white, pink, peach and orange.

Summer belongs to the ornamental herbs. Silver artemisias, native and Mediterranean, shimmer in the heat. Lavender cottons, gray *Santolina chamaecyparissus* and fresh green *S. virens*, contribute more foliage beauty, as does lacy blue rue, *Ruta graveolens*. Fragrant flowers abuzz with bees are most often members of the Labiatae or mint family, a family of seemingly unlimited potential which the horticultural world has just begun to tap. Old favorites like deep blue *Hyssopus officinalis* and pale blue catmint, *Nepeta x faassenii*, are joined by an array of chartreuse-bracted, pink and purple-flowered *Origanum* species. New species of mint family genera *Nepeta*, *Teucrium*, *Mar-*

rubium, *Stachys*, *Scutellaria*, *Dracocephalum*, *Phlomis*, *Lamium* and *Salvia* are being discovered, tried and sold for gardens.

The salvias alone can easily fill a lifetime of experimenting. A few of the newer and more promising species for the Rocky Mountain region are:

- Salvia candidissima*: April, lavender-blue, hairy silver foliage with wavy margins, 6-10".
- S. cyanescens*: May-June, blue-purple, pure white, silky-haired foliage, 1-2'.
- S. hypargeia*: May-June, reblooms later, misty blue, gray-green, deeply cut foliage, 1-2'.
- S. sclarea* var. *turkestanica* (clary sage): June-July, opalescent silvery blue-pink-lavender, large hairy gray-green leaves, reliably perennial form of the well-known biennial, 2-3'.

The mint family member that brings the most joy in late summer is Russian sage, *Perovskia* hybrid. Outrageous and ethereal all at once, this shrubby three to five foot giant dominates the August garden with an all-encompassing blue haze. Gray foliage and white-felted stems add to its refreshing, light appearance.

To complement the predominantly blue and lavender mints, red, orange and yellow summer color is provided by the South African *Kniphofia* and *Crocasmia* species and hybrids, both of which with a little extra water do remarkably well in spite of the cold winters.

Many other perennials, both old and new, are proving ideal for the Rocky Mountain region. Key genera include *Eryngium*, the sea hollies, *Centaurea*, the knapweeds, *Digitalis*, the foxgloves, *Veronica*, *Helichrysum*, *Campanula*, *Iris*, *Paeonia*, *Pulsatilla*, *Limonium*, several pea-family members including *Astragalus*, *Oxytropis* and *Lupi-*

nus, and the scabious group *Knautia*, *Cephalaria* and *Scabiosa*.

Perennials for Shade

Shade gardening in this region is highly versatile. In light, dappled shade, many perennials do well that would need full sun in maritime climates and at lower elevations. In fact, unless the garden is in the montane or subalpine zone, a great number of the traditional border perennials prefer some shade during the hottest, sunniest hours of the day. The fast evaporation rate is slowed somewhat in the shade, and while most of the really lush, large-leaved perennials like *Rodgersia* spp. and *Ligularia* spp. often look sad and droopy, the great majority of border perennials and shade lovers can easily be satisfied with some added organic matter, mulch and a deep weekly irrigation.

For light shade and average water efficiency, a spring garden can be planted with pretty commoners *Brunnera macrophylla* (Siberian bugloss), *Waldsteinia ternata* (barren strawberry), *Symphytum grandiflorum* (small comfrey), *Pulmonaria* spp. (lungwort) and *Anemone sylvestris* (snow-drop anemone). Add a touch of the less common, also in soft pastels, with three early-blooming American natives:

Synthyris missurica: April, dense blue spikes, evergreen rounded leathery leaves, 8-16".

Mertensia lanceolata (chiming bells): April-May, blue bells, often pink in bud, dangling in clusters, Rocky Mountain region native, 10-15".

Tiarella cordifolia var. *collina* (foam-flower): May-June, cream or blush pink spikes, maplelike foliage often flushed with bronze and purple, semi-evergreen, 6-12".

Late spring and early summer is less subtle but still graceful in color, form and

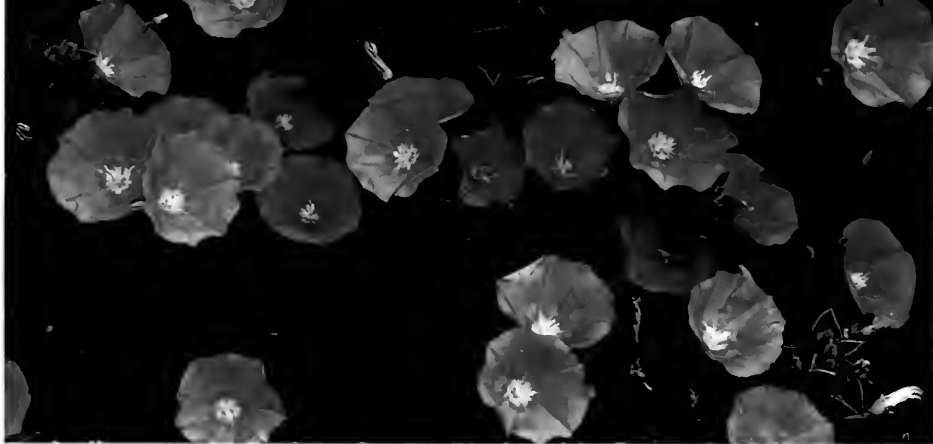
texture. Reliable garden regulars include *Alchemilla mollis* (lady's mantle), *Heuchera sanguinea* and hybrids (coral bells), *Digitalis grandiflora* (yellow foxglove), *Malva moschata* (musk mallow), *Campanula carpatica* (Carpathian bellflower), *Chrysanthemum leucanthemum* (*Leucanthemum vulgare* or ox-eye daisy) and *Aquilegia* spp. (columbine — the native blue columbine, *A. caerulea*, Colorado's state flower, resents hot summers and is not recommended for warmer gardens; *A. chrysantha*, a soft yellow, longer-lived species, is lovely and tougher).

Less well known goat's rue, *Galega officinalis*, blooms most of the summer in lavender, pink or white flower spikes reminiscent of lupines over a large, three-to-four foot mound of tiny pinnate leaves. Pastel daylily cultivars, which take kindly to some light shade to keep their blossoms from fading, make a lovely summer accompaniment.

Good-looking foliage is as important in the shade as in the sun. In light shade, *Bergenia* species lend a lush green look with their large, leathery leaves. In deeper shade, silver-mottled *Lamium maculatum* cultivars and the striking silver-veined *Lamiastrum* 'Herman's Pride' thrive with little attention.

The queen of the late summer and fall shade garden is *Anemone tomentosa*, a large, pink-flowered perennial that looks delicate and graceful yet is the toughest of the Japanese anemones. It has handsome large foliage with white undersides and can be a bit invasive.

This is but the tip of the iceberg. Adventurous gardeners in the Rocky Mountains and High Plains, like the pioneers who came before, should turn their backs to conventional wisdom and explore the relatively untapped frontier of horticulture in the region. ☼



Convolvulus sabatias, a sturdy evergreen groundcover which blooms from June through November, grows admirably with little water.

SELECT PERENNIALS FOR CALIFORNIA GARDENS

BY BOB HYLAND

In California's arid landscape, interest in perennial plants has blossomed. The English perennial movement that took the East Coast of the United States by storm has spread to western shores. California gardeners want English perennial borders just like the rest of the country — perhaps

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more, because of the mild climates and long growing seasons in much of the state.

California is blessed with varied climates conducive to growing plants. Along the state's 750-mile coastline the climate is cool, without extreme temperature fluctuations, and frost-free in many areas. The eastern slopes of the Coast Mountain ranges and the Central Valley have a continental climate with a greater range in temperatures, while the Sierra Nevada Mountains offer a variety of montane climates, depending on elevation. There are few generalizations that can be made about perennial garden-

ing in any region of the state.

The one common “climate” denominator in California is aridity. The San Francisco Bay Area, like other coastal sections of the state, has a Mediterranean climate — wet, cool (but mild) winters followed by dry, cool summers. This equates to six months of rainfall November to April (averaging 23 inches in San Francisco) and six months of no rain May to October. The biggest change for a transplanted East Coast gardener, like me, is no rain (not even a brief thundershower!) and no humidity during the late spring and summer growing seasons. Perennials have to be either drought tolerant, unthirsty, water-efficient or else dependant on summer irrigation.

California, statewide, is in its fifth year of severe drought with winter rainfall well below normal. It is a weather pattern that will end sometime but that will probably repeat itself in the future. Despite these adversities, California gardeners can grow beautiful perennial gardens that rival those of England and temperate regions of the United States. The key is informed plant selection.

Here are twelve to fifteen beautiful, “ecologically sound” perennials that will thrive in Bay Area gardens and, for the most part, have low water requirements once established. They are chosen with a bias to the San Francisco Bay Area where I have lived, gardened and sold perennials for the last three years.

CONVOLVULUS SABATIAS

(GROUND MORNING GLORY)

Sunset Zones 4-9, 12-24; USDA Zone 8

Not enough praises can be sung about this sturdy, evergreen groundcover. Its trailing stems spread to three feet and rarely grow to more than six to eight inches tall. It blooms prolifically in early morning light from June through

November with soft lavender-blue, funnel-shaped flowers about one to two inches in diameter. This diminutive morning glory prefers full sun and will thrive in just about any well drained soil. It will grow admirably with little water — the more moisture you give it the larger the soft, hairy, roundish, gray-green leaves and the faster it spreads. *Convolvulus* is beautiful trailing over a low wall, planter or container or as a filler between taller perennials in the front of the border.

DIASCIA ‘RUBY FIELD’

Sunset Zones 7-9, 14-24; USDA Zone 8

A native of South Africa, ‘Ruby Field’ is easy to grow and has become a “smash hit” at nurseries and garden centers in the Bay Area. Tiny snapdragonlike, coral-pink blooms cover eight- to ten-inch flower spikes throughout the summer months. Cutting back faded flowers will encourage further bloom later in the season. This *Diascia* wants full sun, but also seems to tolerate light shade, especially in hotter areas. It is stoloniferous (but not invasive) and requires regular to moderate water. ‘Ruby Field’ seems to be longer-lived than other diascias, but I’d still advise starting new plants frequently from softwood cuttings and setting them out in the spring. You may be more familiar with its relative, *D. rigescens*, which sports the largest flowers of all diascias in shades of deep pink. It grows in California, too, and is being widely promoted by the University of British Columbia Botanical Garden.

DIGITALIS X MERTONENSIS (FOXGLOVE)

Sunset Zones 2-24; USDA Zones 5-8

This hybrid of *D. grandiflora* and *D. purpurea* requires shade and moisture, but

it still merits a place on this list of plants. Gardeners are always seeking out choice flowering perennials for shady areas. Three-foot spikes of raspberry-pink, bell-shaped flowers rise above a rosette of deep green leaves. The big, bold, softly fuzzy leaves are more rounded than the common foxglove (and in my opinion much more architectural). Even though a hybrid, this foxglove comes true from seed and clumps are also easy to divide. Just control slugs and snails to enjoy the full beauty of this exquisite perennial.

ERYSIMUM 'BOWLES' MAUVE' (WALLFLOWER)
(COMMONLY LABELED *CHEIRANTHUS*)

Sunset Zones 14-24; USDA Zone 8

This perennial easily makes my "ten best list" for California. A mounded, two-foot-tall mass in the border, *Erysimum* sports clusters of mauve (soft purple) flowers blooming above blue-green foliage. It is just about the first perennial to bloom in spring (March and April), and if deadheaded after flowering will bloom again and again. 'Bowles' Mauve' is undemanding when it comes to water or soil. It is a sterile selection and must be propagated from softwood cuttings. Combine it with *E. 'Variegatum'* with its yellow and cream variegated foliage for interesting effect.

FRANCOA RAMOSA (MAIDEN'S WREATH)

Sunset Zones 4-5, 8-9, 13-24; USDA Zone 8

From the mediterranean climate of Chile comes one of the easiest perennials to grow in western gardens. In early summer, two- to three-foot wandlike flower stalks rise above a basal clump of foliage (larger, coarser versions of dandelion leaves). The white (sometimes flushed with pink) blossoms stand out best

against a dark green shrub background or massed among rocks. Maiden's wreath prefers light shade and will suffer foliage burn and flower wilt in full sun in hotter regions of California. However, it's not fussy about soil or water.

GAURA LINDHEIMERI (GAURA)

Sunset Zones 1-24; USDA Zone 5

The first time I saw the wiry, white flower spikes of this two- to four-foot, vase-shaped perennial backlit by late afternoon sun in a California garden, I put it on my wish list. The blossoms are pink in bud, open to white and fade to pink. Flower stems continue to elongate as the lower blooms drop off and provide color from July through October; once they have set seed they should be cut off to prevent self-sowing. Plant gaura, a native of the southwest United States, in full sun and ordinary soil and you can neglect it. With too much water and rich soil it will sprawl and have to be staked.

IRIS DOUGLASIANA (DOUGLAS IRIS)

Sunset Zones 4-24; USDA Zone 8

For coastal California gardeners Douglas iris is more appropriate than the more traditional tall bearded (*I. x germanica*), Siberian (*I. sibirica*) and Japanese irises (*I. ensata*). *I. douglasiana* is one of three species native to the Pacific Coast that have produced many hybrids and named selections. Clumps of evergreen, straplike leaves reach one to one and one-half feet in height. Two to three or more flowers bloom atop two-foot stalks in a broad spectrum of white, cream, yellow, lavender, blue, red and purple. Douglas irises grow well in full sun at the coast and partial shade inland. They tolerate salt spray, wind and summer drought once established, but not high

temperatures and heavy soils. I think the best use is to let them naturalize on banks, in meadow gardens and informal borders in a variety of colors. Or select just the right flower form and color for your garden from specialty growers.

LAVANDULA STOECHAS

(SPANISH LAVENDER)

LAVANDULA 'QUASTI'

(*L. DENTATA* X *L. STOECHAS*)

Sunset Zones 4-24; USDA Zones 8-9

Of the three species of lavenders native to the Mediterranean region, English lavender (*L. officinalis*) and its cultivars are the more traditional and popular. For California gardens, Spanish lavender and a hybrid between French and Spanish lavenders are just as ornamental and a little more drought tolerant. Fat, knobby flower clusters are topped with tufts of purple bracts that are more showy and colorful (especially *L. 'Quasti'*) than any English lavender. Both of these lavenders grow into aromatic, two- to three-foot, gray-foliaged shrubs that tend to sprawl and trail a bit more than other species. Full sun, a lean diet, good drainage and little summer water are the ideal cultural regimes for this perennial in California gardens.

LEONOTIS LEONURUS (LION'S TAIL)

Sunset Zones 8-24; USDA Zones 8

Among the joys of living in the Bay Area is growing lion's tail to its full four- to six-foot glory. With age it becomes a coarse-textured, woody subshrub best planted at the back of the border. From mid-August to November orange flowers appear in widely spaced whorls on tall vertical spikes. The common name, lion's tail, comes from a fancied likeness of the flower stem to the king of the jun-

gle's tail. Native to tropical Africa, *Leonotus* thrives in full hot sun, loamy soil and moderate moisture. It also tolerates drought and poor soils, but will succumb to heavy frost. Combine this orange perennial with tall, yellow flowers like Jerusalem-sage (*Phlomis fruticosa*), yarrows (*Achillea* spp.) or mulleins (*Verbascum* spp.).

PENSTEMON GLOXINIOIDES

(GARDEN PENSTEMON)

Sunset Zones 8-24; USDA Zones 8-9

Many of the 250 species of penstemon are native to the western United States, particularly California. The common garden varieties grow into two- to four-foot clumps and are unrivaled for color from May through October in the mid-levels of the perennial border. Tubular flowers in a wide range of white, pink, red and purple are arranged in numerous pairs on loose spikes above clean, deep green foliage. In full sun and average, well drained soils penstemons will last from three to five years and then require replanting. Rich, heavy, wet soils usually shorten their life expectancy. Penstemons are also best cut back three to four inches below the lowest flowers during the growing season to encourage rebloom and cut in half in February to prevent legginess. Among the best cultivated varieties are 'Garnet' for red flowers and 'Huntington Pink' with its clear, medium pink blooms with white throats.

PHORMIUM TENAX 'MAORI SUNRISE' AND 'MAORI MAIDEN' (NEW ZEALAND FLAX)

Sunset Zones 7-24; USDA Zones 8-10

Many of the new varieties of New Zealand flax grow to three to five feet tall, and their smaller size makes them more useful in California gardens than the old

ten-foot *Phormium tenax*. The more colorful evergreen foliage of the new introductions allows them to stand alone or blend with other perennials. Their striking architecture varies from stiff, sword-shaped fans to billowy fountains. New dwarf introductions include 'Maori Maiden' with longitudinal leaf colors ranging from deep pink to maroon and a graceful arching habit from three to four feet. 'Maori Sunrise' grows a bit taller and more upright to five feet with pink, green and peach colored leaves. These bold, dramatic accent plants do best in full sun for brightest leaf color and can get by on very little water after they are established.

ROMNEYA COULTERI

(MATILJA POPPY, FRIED EGG PLANT)

Sunset Zones 1-24

In my opinion this six- to eight-foot-tall, deciduous perennial is one of the most beautiful California natives. It combines

well with salvias, buckwheats (*Eriogonum* spp.) and bunchgrasses. Large blooms are six to eight inches in diameter; white, crepe papery petals surround a cluster of two-inch golden stamens that are reminiscent of fried eggs. From May through September, they fill the air with the pleasant fragrance of ripe apricots. *R. coulteri* is difficult to get established, but once settled spreads underground to form large colonies. With regular watering, plants can become invasive; excess summer water may actually cause plants to rot. Contrary to your gardening instincts, hold the water from June through September, site in full sun and plant in poor, well drained soils. What could be easier?

SALVIA LEUCANTHA (MEXICAN BUSH SAGE)

Sunset Zones 10-24; USDA Zone 9

This four-foot by four-foot perennial offers graceful, arching sprays of purple flow-



CHRISTOPHER WOODS

For coastal California gardeners *Iris douglasiana* is more appropriate than tall bearded, Siberian or Japanese irises.

ers almost year-round in the Bay Area and other mild areas of California. One form has a white corolla with purple center, and the other is entirely purple. Leaves and stems are gray and wooly and should be kept in bounds by shearing back heavily at least once a year. I recommend *S. leucantha* for dry bank and border plantings because of its drought tolerance. Another salvia of softer color and informality is the exquisite, five-foot-tall *S. uliginosa* from South America. It blooms with waving sprays of azure blue flowers August through September. It is an open, wispy sage that is best supported by other tall perennials or a fenceline.

ZAUSCHNERIA CALIFORNICA

(*EPILOBIUM CANUM*) (CALIFORNIA FUCHSIA)

Sunset Zones 2-10, 10-24

When I first discovered it at Western Hills Nursery in Occidental, California, I smuggled this western native back to

Delaware to grow in a container. Now I enjoy mass plantings outdoors in the Native Plant Garden at Strybing Arboretum and Botanical Gardens where I work. One to two-inch, tubular, scarlet and reddish orange flowers bloom from August through October and are a favorite source of nectar for hummingbirds. Established plants reach two feet in height and should be severely pruned after flowering; they are a bit rangy and never become completely domesticated in gardens. Successful growth requires fast-draining soils and sparse summer water. California fuchsia combines well with low-growing *Ceanothus*, native penstemons and bunchgrasses, monkey flowers and *Ribes* spp.

I've babied many of these perennials in sheltered outdoor spots, cool greenhouses and containers in the temperate East and now I marvel at how easily they grow outdoors year-round in the Bay Area. ☀



Tiny snapdragonlike, coral-pink blossoms cover the eight- to ten-inch flower spikes of *Diascia* 'Ruby Field' all summer long.

NEW PERENNIALS FROM EAST ASIA

BY BARRY R. YINGER

A thumping revival of interest in new perennials has accompanied the rebirth of the herbaceous perennial border in America. This increased interest means more than a search for larger flowers in a broader range of colors. There is deep interest in foliage color and texture, as well as the overall form of herbaceous plants. The flowers of many new perennials are scarcely noticeable and often completely expendable.

The use of perennials in America has been shaped largely by past and present efforts of English and German gardeners and designers. However, many of the novelties now available come to us from the fields and forests of China, Japan and Korea. Opportunities to find both new species and new cultivated selections of perennials in Asia seem unlimited.

Angelica gigas is a perennial new to America. Although its individual flowers

are tiny, it is overall a unique, highly dramatic plant that seems set to sweep the gardening world.

Angelica gigas stopped me dead in my tracks the first time I saw it rising above a carpet of late-summer wildflowers in a sub-alpine meadow near the summit of Odae Mountain in northeastern Korea. Its startling purple domes of flowers buds had just emerged from voluptuous purple sheaths. I was smitten by these stately head-high beauties but doubted their adaptability; otherwise how could something so striking have escaped domestication for so long?

In the fall of 1982 a Korean friend, Mr. Young June Chang, returned to the mountain at my request to collect seeds. Those few seeds, plus a later collection acquired by the U.S. National Arboretum, became the source of this plant in cultivation.

In my garden *A. gigas* turned out to be surprisingly easy. It requires only fairly rich soil that doesn't get too dry, and shelter from the hottest afternoon sun. It begins to decline after its second year, but grows easily from fresh seed which is produced in quantity. The bold, coarsely divided foliage is a good contrast for finely textured tall grasses such as *Miscanthus*

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sinensis 'Gracillimus'. Its rich purple inflorescences combine beautifully with pink-to lavender-flowered perennials such as purple coneflower (*Echinacea purpurea*), or provide striking contrast with flowers such as orange daylilies.

Scarcely known but equally valuable is another perennial I first encountered in Korea: *Peucedanum japonicum*. This perennial also offers coarsely divided foliage, but in this case the leaves are gray and almost succulent, to about eighteen inches tall. It is a wonderful blender in the garden, an excellent foil for richly colored flowers or foliage and spiky textures. The yellow-green flowers are insignificant.

I first came across *Peucedanum japonicum* growing among the wrack and rock at the high tide line on a tiny Korean island called An Do. The steep slopes above sparkled orange and yellow with clumps of *Hemerocallis coreana* and *H. thunbergii*. Once again I was impressed by a completely unfamiliar perennial, but doubtful of its adaptability to normal garden conditions. After six years of problem-free growth in my USDA Zone 6 Pennsylvania garden, I consider it completely dependable. It needs only full sun and good drainage to prosper.

For wet, poorly drained areas a Chinese perennial, *Saururus chinensis*, awaits popularity. This is the Chinese counterpart of our American lizard's-tail, a common but undistinguished colonizer of freshwater wetlands. The Asian version is much more glamorous, with glossy foliage and a set of snow-white leaves at the tip of each three-foot stem in summer. The true flowers are clustered in a slender nodding spike.

Saururus chinensis can be grown with its roots submerged in water or in moist soil, in sun. It is a beautiful complement for the large-flowered perennial hibiscus.

Because *Saururus* spreads strongly by thick white rhizomes to form large colonies, it will swamp delicate neighbors. However, the rhizomes are near the surface of the soil and are relatively easy to remove. It can also be grown in a container plunged into the soil.

The continuing *Hosta* boom affirms American interest in perennials with decorative foliage that are well adapted to shady sites. Other shade-loving plants with interesting foliage seem bound to attract similar interest. Some of the finest examples of such plants are the Asian species of *Asarum*, wild ginger.

Of the 150 or so species of *Asarum* in the world, all but about fifteen are found in temperate to warm-temperate Asia, from the Himalayas east through Japan. Most are highly ornamental, often with silver or gray patterns on dark green, evergreen leaves. Although some are a little tender for general use, many species are hardy in USDA Zones 5 and 6. Almost all are hardy in USDA Zones 7 and 8. Some species spread by rhizomes into extensive mats of foliage, while others form distinct, slowly expanding clumps. Those that spread by rhizomes are useful as ground covers in limited areas, while the clump-formers are unusual accents in the shade garden.

One of the best groundcover species is *Asarum takaoi*, an evergreen species from central Honshu, the main Japanese island. It is variable, but normally forms a mat of heart-shaped leaves, each two to three inches long. Most plants have silver-mottled foliage, and the best forms are quite beautiful. The small, brownish-purple flowers are borne at ground level. This species is very hardy, at least through USDA Zone 5, and should be divided in spring every two or three years for maximum cover.

Asarum curvastigma is a clump-forming

species of unusual beauty. Its leaves are variable in shape, but usually more or less the shape of an arrowhead, to about five inches long. Cloudy gray markings cover most of the surface of dark green, matte, evergreen leaves. *Asarum tamaense* is a related species with more rounded, glossy, dark green leaves. The convex leaf surface is covered with indented veins, producing an unusual, rough-textured effect. Both species are hardy in USDA Zone 6.

All *Asarum* need well drained, woody soil that remains slightly moist. They thrive without any direct sunlight, but good air circulation will reduce damage from slugs or fungus diseases.

Not all perennials are as satisfactory in gardens as they are in nature. Among *Sanguisorba* the American *S. canadensis* is a beautiful ornamental just as it is, but its Asian cousin *S. officinalis* attracts little



For wet, poorly drained areas a Chinese perennial, *Saururus chinensis*, is destined for popularity.

applause. Although it has interesting ferny foliage, its brownish-purple flowers are not easily seen, and its tall stems flop over as it begins to flower.

My interest in *Sanguisorba officinalis* increased when I found that there are several select forms in Japan. The best, called 'White Edge' ('Shiro Fukurin' in Japanese), has leaves variegated with a distinct white margin. It is beautiful from spring to fall, and the white margin sets off the flowers well.

Among the other forms selected by the Japanese are a yellow-variegated cultivar, a white-flowered form and a dwarf selection. I hope to test them all. *Sanguisorba* needs good soil that doesn't dry completely and protection from the hottest afternoon sun to look its best.

Americans who know the *Lespedeza*, or bush clovers, are likely to think of them as a forage crop for cattle, but the Japanese have recognized their special beauty for hundreds of years. To the Japanese eye, *Lespedeza* is a good example of a garden plant that expresses the concept of *shibusa*, a highly refined, somewhat rustic elegance tinged with melancholy. As one of the last garden flowers of autumn, it reminds us that the austere winter landscape is close at hand.

Lespedeza is very useful in the garden landscape, especially as we recognize the special value of flowers outside the spring floral peak. Arching stems four to six feet tall are furnished with compound leaves with rounded leaflets. The summer effect is fresh and elegant. Clumps of *Lespedeza* about six feet apart form excellent cover for beds of spring bulbs. As the bulbs' foliage yellows, the new stems of *Lespedeza* hide their faded glory.

Lespedeza thunbergii, the species most commonly grown in gardens, enjoyed a burst of popularity in the United States in

the late 19th and early 20th centuries. A large-flowered Japanese selection with typical purplish-rose flower color called 'Daruma' has persisted on old estates throughout the eastern United States. Other Japanese selections available here include 'Albiflora', with very late, pure white flowers, and 'Shibori', with purplish-rose and white flowers on the same plant. *Lespedeza*'s display of pea-flowers is showy enough to be decorative, but just soft enough to blend peacefully with the other flowers and foliage of autumn.

Lespedeza thunbergii (including what was once called *L. japonica*) is an extremely variable species, so there are many less well known selections still to be tested. Among the best are two selected from plants found on the grounds of Montrose Nursery in Hillsborough, North Carolina, at an estate long known as Montrose. One is a white-flowered selection called

'White Fountain', with long-blooming white flowers that start in September and continue to hard frost. The flowers are well distributed on arching branches. 'Pink Fountain' is similar, but with clear pink flowers with no purplish cast.

A former occupant of Montrose was William A. Graham, Secretary of the Navy under Millard Fillmore, who sent Admiral Perry to open Japan to the West. A number of uncommon Japanese plants made their way back to the estate called Montrose in the late 1800s, and some still thrive there. Many other *Lespedeza* cultivars in Japan have not yet been tested in this country.

The never-ending process of finding new perennials and testing their value in American gardens becomes more exciting as interest and demand increase. The bountiful supply of species and cultivars throughout Asia will keep our gardens fresh and exciting for a long time. ☼



The author first came across gray-leaved *Peucedanum japonicum* growing among rocks at the high tide line on a tiny Korean island.

PERENNIALS FOR FOLIAGE DISPLAY

BY MAGGIE OSTER

With the thousands of flowers available, it may seem odd to grow plants for their leaves. However, one need only to consider the feeling of serenity in a Japanese garden or a shaded glen for some inkling of the effectiveness of foliage alone. Consider, too, how the many shades of green, as well as gray, silver, blue, bronze, red or variegated foliage can either harmonize or contrast with other plants. Foliage also adds different textures to the landscape, and different sounds as well — the rustling of grasses, for example. What's more, foliage is present throughout the growing season, not just for a few weeks as are most flowers.

A surprising number of herbaceous perennials are grown primarily for foliage. Looking strictly at genus and species, not even counting cultivars, there are almost a hundred readily available perennials grown mainly for their leaves. Add to this another four or five dozen flowering perennials with long-lasting, attractive foliage, and it becomes obvious that there is a wealth of material from which to draw.

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Ferns and ornamental grasses are the two most important groups of foliage plants. Most ornamental grasses do best in full sun, while most ferns prefer light to full shade. Hostas are the other staple foliage perennial of the shade garden.

Although there are exceptions, the grasses basically offer fine texture in the garden with their relatively narrow, arching leaves. A few types have stiffer growth. Heights range from less than a foot (the spiky-leaved blue fescue, *Festuca cinerea*) to over 12 feet (the giant reed, *Arundo donax*, and pampas grass, *Cortaderia selloana*), but most are in the three to six-foot range. Colors vary from light to dark green, blue, red and variegated. While the grasses do flower, the colors are usually muted beiges and browns, so these tend to enhance the foliage effect.

More than any other herbaceous perennial, grasses offer year-round interest in the garden with their persistent leaves and seed heads. In the landscape, they can be integrated into flower or shrub beds and borders for their contrasting texture, or utilized as specimen plants, or planted in masses or in meadow gardens.

The most popular of the ornamental grasses is eulalia, *Miscanthus sinensis* and

FLOWERING HERBACEOUS PERENNIALS WITH OUTSTANDING FOLIAGE

- Achillea filipendulina*, *A. millefolium*, *A. tomentosa* (Yarrow)
Aconitum bicolor, *A. carmichaelii* (Monkshood)
Anemone x hybrida, *A. vitifolia* 'Robustissima' (Japanese anemone)
Arabis caucasica, *A. procurrens*, *A. sturii* (Rockcress)
Alchemilla mollis (Lady's mantle)
Armeria maritima (Thrift)
Aruncus dioicus (Goatsbeard)
Astilbe x arendsii, *A. chinensis* 'Pumila', *A. tacquetii* 'Superba' (Astilbe)
Baptisia australis (False indigo)
Begonia grandis (Hardy begonia)
Belamcanda chinensis (Blackberry lily)
Bergenia ciliata, *B. cordifolia*, *B. crassifolia* (Bergenia)
Cerastium tomentosum (Snow-on-the-mountain)
Chrysanthemum pacificum
Cimicifuga japonica, *C. simplex* (Bugbane)
Coreopsis verticillata (Threadleaf coreopsis)
Crambe cordifolia, *C. maritima*
Crocsmia x 'Lucifer'
Dianthus spp. (Pinks)
Dicentra eximia, *D. formosa* (Bleeding heart)
Dictamnus albus (Gas plant)
Disporum flavum (Fairy bells)
Echinops spp. (Globe thistle)
Epimedium spp. (Bishop's hat)
Eryngium spp. (Sea holly)
Euphorbia epithymoides (Cushion spurge)
Filipendula palmata, *F. purpurea*, *F. rubra* 'Venusta', *F. vulgaris* (Dropwort)
Geranium spp. (Cranesbill)
Helleborus spp. (Hellebore)
Hemerocallis spp. (Daylily)
Heuchera spp. (Coral bells)
Iris spp. (Iris)
Kniphofia uvaria (Red hot poker)
Lavandula angustifolia (Lavender)
Ligularia spp. (Ragwort)
Limonium latifolium (Sea lavender)
Lupinus 'Russell hybrids' (Lupine)
Lychnis coronaria (Rose campion)
Nepeta x faassenii (Catmint)
Opuntia humifusa (Prickly pear)
Paeonia spp. (Peony)
Phlox subulata (Moss phlox)
Primula spp. (Primrose)
Sanguinaria canadensis (Bloodroot)
Santolina virens (Santolina)
Saxifraga stolonifera, *S. umbrosa*, *S. x urbium* (Saxifrage)
Sedum spp.
Sempervivum spp. (Stonecrop)
Thalictrum spp. (Meadow rue)
Thymus spp. (Thyme)
Verbascum spp. (Mullein)
Veronica spp. (Speedwell)
Yucca filamentosa, *Y. smalliana*, *Y. glauca* (Yucca)

its cultivars. Lovely, vase-shaped plants, they grow five to eight feet tall and bear pink-beige flowering plumes in late summer and fall. Both leaves and seed heads turn straw-colored in winter, and provide seasonal interest lasting until spring, when they should be cut down to allow for new growth. The best-known cultivars are 'Gracillimus', with very fine-textured leaves; 'Variegatus' with leaves striped yellow, white and green; and 'Zebrinus', with horizontal yellow bands on the leaves.

Feather reed grass (*Calamagrostis x*

acutiflora 'Stricta') is another vase-shaped grass with a strong vertical effect. Growing three to five feet tall, it is best planted in groups. Plume grass (*Erianthus ravennae*) is a dramatic, imposing grass growing seven to ten feet tall. Fountain grass (*Pennisetum alopecuroides*) is another graceful grass, with unique fuzzy, cylindrical flowers on three-foot plants. Needle, or feather, grasses (*Stipa* spp.) and moor grasses (*Molinia* spp.) offer other possibilities.

Several grasses have blue foliage, an effective foil for flowers, whether combined



in a monochromatic garden with blue flowers such as delphinium, veronica and salvia, blending with flowers in shades of pink and lavender or contrasting with bright yellows and oranges. The blue-leaved grasses include big bluestem (*Andropogon gerardii*), growing three to eight feet tall with upright, gently arching leaves; blue lyme grass (*Elymus glaucus*), with rapidly spreading straplike leaves to four feet; blue oat grass (*Helictotrichon sempervirens*), with fine-textured, stiff clumps to two feet; and blue fescue (*Fes-*



PHOTOS BY AUTHOR



ABOVE: Foliage plants add different textures to the landscape, as well as infinite shades of green, gray, gold, blue, bronze and red.

LEFT: *Phalaris arundinacea* var. 'Picta', ribbon grass, is a vigorously spreading plant with two- to three-foot leaves striped in white.

tuca cinerea), with very fine-textured, rounded clumps eight to ten inches tall.

For an airy effect, consider quaking grass (*Briza media*), with very narrow, two-foot leaves and quaking seed heads, or switch grass (*Panicum virgatum*), with stiff, upright leaves to three feet and frothy seed heads growing to five feet. The three- to four-foot arching seed heads of northern sea oats (*Chasmanthium latifolium*) also add grace to the garden.

Besides some forms of eulalia, two other plants add variegation to the garden. Variegated Japanese sedge (*Carex morrowii* 'Variegata') has a creamy white swath down the center of gently curving leaves growing 12 inches tall. Ribbon grass

(*Phalaris arundinacea* var. *picta*) is a vigorously spreading plant with two- to three-foot leaves striped in white.

The most brightly colored grass is Japanese blood grass (*Imperata cylindrica* 'Red Baron') with broad, spiky leaves in a brilliant shade of red. This plant is best grown in masses or among rocks, with the site chosen so it can be viewed with sunlight shining through the leaves.

The hundreds of bamboos are also members of the grass family, and a number are useful garden plants, particularly for warmer climates. Some of the shorter types, including *Arundinaria* spp. and *Sasa* spp., make rapidly expanding groundcovers whose

HERBACEOUS PERENNIALS GROWN MAINLY FOR FOLIAGE

Acanthus mollis, *A. spinosus*, *A. perringii* (Bear's breech)
Adiantum pedatum (Maidenhair fern)
Aegopodium podagraria 'Variegatum' (Variegated goutweed)
Ajuga reptans (Bugle weed)
Andropogon gerardii (Big bluestem)
Artemisia abrotanum (Southernwood)
Artemisia absinthium (Wormwood)
Artemisia ludoviciana 'Silver King' and 'Silver Queen' (Silver King and Silver Queen artemisias)
Artemisia schmidtiana 'Silver Mound' (Silver Mound artemisia)
Arum italicum marmoratum (Painted arum)
Arundo donax (Giant reed)
Asarum canadense, *A. europaeum* (Wild ginger)
Asplenium platyneuron, *A. trichomanes* (Spleenwort)
Athyrium filix-femina, *A. niponicum*

pictum (Lady and Japanese painted ferns)
Macleaya cordata (Plume poppy)
Briza media (Quaking grass)
Calamagrostis acutiflora 'Stricta' (Feather reed grass)
Carex morrowii 'Aurea-variegata', *C. stricta* (Sedge)
Chasmanthium latifolium (Northern sea oats)
Cortaderia selloana (Pampas grass)
Dennstaedtia punctilobula (Hayscented fern)
Dryopteris spp. (Shield ferns)
Elymus arenarius (Blue lyme grass)
Erianthus ravennae (Plume grass)
Festuca ovina glauca (Blue fescue)
Foeniculum vulgare purpureum (Fennel)
Galium odoratum (Sweet woodruff)
Helictotrichon sempervirens (Blue oat grass)
Heuchera 'Palace Purple' (Coral bells)

roots must be contained. The tall-growing clump types have a graceful arching effect.

Two grasslike plants frequently used as groundcovers or edging plants are both called lily-turf. *Liriope muscari* grows to two feet tall and *L. spicata* to one foot. Less hardy is *Ophiopogon jaburan*, growing to three feet, and *O. japonicus*, growing to one foot.

Why people struggle to grow marginally adaptable plants in shady conditions when there is a wealth of ferns is a mystery. Provided with a humus-rich, moist but well drained soil, most ferns are stunning whether grown in masses of a single variety or a combination of several different kinds. They also combine well with other shade-loving foliage plants like hostas (*Hosta*

spp.), bugle weed (*Ajuga reptans*), wild ginger (*Asarum* spp.), sweet woodruff (*Galium odoratum*), Solomon's seal (*Polygonatum* spp. and *Smilacina* spp.) and lungwort (*Pulmonaria* spp.) as well as flowering perennials for shady conditions.

Among the ferns to consider are maidenhair fern (*Adiantum pedatum*), spleenworts (*Asplenium* spp.), lady fern (*Athyrium filix-femina*), hay-scented fern (*Dennstaedtia punctilobula*), shield ferns (*Dryopteris* spp.), ostrich fern (*Matteuccia struthiopteris*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*Osmunda claytoniana*), royal fern (*Osmunda regalis*),

Hosta spp. (Hosta)
Houttuynia cordata 'Variegata' (Chameleon plant)
Imperata cylindrica 'Red Baron' (Japanese blood grass)
Iris pallida 'Variegata' and 'Aurea-Variegata', *I. laevigata* 'Variegata', *I. pseudacorus* 'Variegata' (Variegated iris)
Lamium maculatum 'White Nancy' and 'Beacon Silver' (Deadnettle)
Liriope muscari (Lily-turf)
Marrubium incanum (Silver horehound)
Matteuccia struthiopteris (Ostrich fern)
Miscanthus spp. (Eulalia grass)
Molinia caerulea 'Variegata' (Variegated moor grass)
Onoclea sensibilis (Sensitive fern)
Ophiopogon jaburan, *O. planiscapus* 'Nigrescens' (Mondo-grass)
Osmunda cinnamomea, *O. claytoniana*, *O. regalis* (Cinnamon, interrupted, and royal ferns)
Panicum virgatum (Switch grass)
Darmera peltata (Umbrella plant)
Pennisetum alopecuroides (Fountain grass)

Phalaris arundinacea var. *picta* (Ribbon grass)
Polygonatum odoratum var. *thunbergii* 'Variegatum' (Variegated Japanese Solomon's seal)
Polypodium vulgare (Common polypody)
Polystichum acrostichoides, *P. setiferum* (Christmas and soft shield ferns)
Pulmonaria angustifolia, *P. officinalis*, *P. rubra*, *P. saccharata* (Lungwort)
Rheum raphonticum (Rhubarb)
Rodgersia aesculifolia, *R. pinnata*, *R. podophylla*, *R. tabularis* (Rodgersia)
Salvia argentea, *S. officinalis* 'Icterina', 'Purpurascens', 'Tricolor' (Sage)
Santolina chamaecyparissus, *S. incana*, *S. virens* (Santolina)
Sempervivum spp. (Stonecrop)
Stachys byzantina (Lamb's ear)
Stipa gigantea, *S. pennata* (Giant feather grass)
Thymus spp. (Thyme)

common polypody (*Polypodium vulgare*), Christmas fern (*Polystichum acrostichoides*) and soft shield fern (*Polystichum setiferum*).

A bit out of the ordinary is the Japanese painted fern (*Athyrium niponicum pictum*) with gray-green fronds tinged with pink and accented with purple-brown stems.

For a bold accent or mass in the garden, try the various forms of bear's-breech (*Acanthus* spp.), hardy only to about 10 degrees F and with large, shiny leaves to four feet tall; the plume poppy (*Macleaya cordata*) with gray-green leaves on six- to eight-foot plants; umbrella plant (*Darmera peltata*) (*Peltiphyllum peltatum*), a plant for wet soil and light shade with leaves two feet across; rhubarb (*Rheum rhabarbarum* and its giant relative *R. palmatum*) with exotic dark green leaves and red stems; and rodgersia (*Rodgersia* spp.), which grows to four feet and needs moist soil and light shade.

White-, gray- and silver-leaved plants may be used in a monochromatic white-flowered garden, as a visual break between brightly colored flowers, or for merging various elements in the garden visually. The various artemisias are outstanding examples, and include the southernwood (*A. abrotanum*), wormwood (*A. absinthium*) 'Lambrook Silver' and 'Powis Castle', *A. ludoviciana* 'Silver King' and 'Silver Queen' and silvermound artemisia (*A. schmidtiana*). Other herbaceous foliage plants of this genre are silver horehound (*Marrubium incanum*), culinary sage (*Salvia officinalis*), wooly sage (*Salvia argentea*), santolina (*Santolina chamaecyparissus*) and lamb's ears (*Stachys byzantina* 'Silver Carpet').

Variegation in the garden can be a blessing or bane, depending upon how it's used. Discretion or boldness seem to be the best ways to deal with it. Anything in

the middle becomes wishy-washy. Used well, variegated plants provide the effect of a shaft of sunlight dancing in the garden.

Where you want nothing else to grow, consider the ferociously spreading variegated goutweed (*Aegopodium podagraria* 'Variegatum') as a groundcover. The painted arum (*Arum italicum* 'Marmoratum') is a more conservatively growing woodland plant. The variegated forms of dead nettle (*Lamium maculatum*), such as 'Beacon Silver' and 'White Nancy', make excellent ground covers in light shade, as do the variegated ajugas. The delicately speckled foliage of lungwort (*Pulmonaria* spp.) also brightens up lightly shaded areas. Few plants are as elegant as the gracefully arching variegated Japanese Solomon's seal (*Polygonatum odoratum thunbergii* 'Variegatum'). And, of course, there are the hundreds of different cultivars of variegated hostas.

Variegated foliage perennials for full sun include the variegated culinary sages (*Salvia officinalis* 'Icterina' and 'Tricolor'); the stiff, swordlike leaves of the variegated irises (*Iris pallida* 'Variegata', *I. p.* 'Aureo-Variegata', *I. laevigata* 'Variegata' and *I. pseudacorus* 'Variegata'); and the green-, gold- and red-patterned leaves of the chameleon plant (*Houttuynia cordata*), another vigorously spreading groundcover.

Perennials with purple leaves add a striking note to plantings, whether harmonizing with flowers in shades of blue or pink or contrasting with yellows and oranges. Consider *Heuchera* 'Palace Purple', *Salvia officinalis* 'Purpurascens', *Foeniculum vulgare purpureum*, *Rodgersia pinnata* 'Superba', *Ligularia dentata* 'Desdemona' or 'Othello', *Cimicifuga racemosa* 'Atropurpurea', *Ajuga pyramidalis* 'Metallica Crispa' or *A. reptans* 'Bronze Beauty' and *Ophiopogon planiscapus* 'Arabicus'. ☼

MINGLING ROSES AND PERENNIALS

BY JACK POTTER

I grew up with an asylum approach to gardening, digging enclaves within my family's garden to meet the needs of one or another plant. Irises were confined to their own bed, where they could be sprayed for borers and divided at intervals. Dahlias (and dahlia stakes) filled the dahlia bed. Delphiniums inhabited a sort of compost pile made in place. Roses, as a matter of course, were restricted to the rose ward, under strict sanitary precautions and a weekly fungicide regimen. Now I mix plants freely, and the hallmark of my home garden has become the combination of roses and herbaceous perennials. They do each other good — visually and culturally.

Perennials by themselves often lack structure. Meadow gardens are in vogue, but a nominally formal perennial border can look too loose and meadowlike. Integrating solidly built, woody plants into the border is a cure for that laxness. It can also help to anchor the border within the gar-

den, give it an apparent reason for being where it is and not, say, ten feet to one side.

In my garden these shrubs within the borders are chiefly roses. They give the beds and borders bones without breaking up the feeling of flowery abundance that is the reason for gardening with roses and perennials in the first place. Their woody stems give support to perennials which might otherwise need staking. Roses can also take the place of some of the taller perennials; this means either less staking — or staking roses rather than perennials! Foliage from other plants at the base of roses helps keep the soil and rose roots cool, and separating the roses with other plants between reduces the spread of rose fungus spores. Roses in turn provide shade and shelter; toward the base of a rose I may work in a bleeding heart or a lungwort that would bake in the open.

The roses which mingle best with other plants are not standard-issue hybrid teas, grandifloras or floribundas. In the mid-nineteenth century rose breeders began to concentrate on cut flowers for exhibition as individual blossoms from cosseted plants; this trend continues in the modern hybrid tea. Less fashionable, tougher, older vari-

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eties began to be called garden roses, and "old garden rose" is a phrase now used to group the many classes of roses existing before the first hybrid tea. What we want for a rough-and-tumble mingling of roses and perennials are garden roses, old or new. They must be tough enough to compete with neighboring plants, and they should be chosen for the beauty of the whole plant, rather than for the individual flower. It will be a great help if the flowers are beautiful fully open (when they make their greatest effect in the garden), rather than passing from narrow buds to the regrettable condition of full-blown, bedraggled hybrid teas. Fragrance, the original virtue of the rose, may be more prized in the garden than on the show bench.

Do such roses exist? Many of the old garden roses are suitable, as are some of the modern shrub roses, rugosas, hybrid musks, the Meidilands and David Austin's splendid new English roses. Some polyanthas and floribundas might fit, as would, given support, many climbing roses. The choice could be narrowed on grounds of winter hardiness, disease resistance, plant form, color, repeat bloom, showy fruit, historical period, foliage color or texture... there is a lot to work with here.

The range of perennials to combine with roses is also vast. Herbaceous plants can precede the rose season, augment it or follow up. They can blend with rose colors or contrast; they can repeat the predominant soft roundness of the roses, punctuate it with spikes, or recede from the scale of the roses into mists of small flowers or leaves.

My own garden is at its best in June. The perennials I find most useful with the roses at the height of their show weave softly among them — or erupt in spiky contrast. The weavers include hardy gerani-

ums, violas, campanulas, lady's mantle, marrubium and clematis. These wander into each other and the roses (sometimes climbing up a shrubby stem) and tie all together into a rich and complex tapestry. Spiky shapes (and color contrasts) prevent blandness. Foxgloves, spiky campanulas, veronicas, kniphofias and iris foliage provide enough emphasis, but I am tempted to add the bold and glossy, arching foliage of acanthus and its upright spikes of bloom. *Eremurus*, foxtail lilies, would be wonderful with their pastel spires, perhaps in a larger garden or one with more salmon tones. Delphiniums are for the ambitious, or for cool-climate gardeners.

Whether roses are in the old rose colors from crimson and magenta through lilac pink and white, or in the wide modern color range including scarlet, flame, yellow and salmon, blue is the indispensable soft contrast. Violas and campanulas offer clear lavender blues; hardy geraniums like *G. 'Johnson's Blue'*, *G. pratense*, and *G. x magnificum* veer toward purple. *Campanula persicifolia* is the model companion for roses: soft lavender-blue bellflowers on a not-too-emphatic spike. *Allium christophii* is another favorite, its steely-mauve ten-inch globular flower head made up of minutely spiky stars.

Pale yellow is the other color that seems to work everywhere, and *Digitalis grandiflora* is the valued, yellow, spiky equivalent of *Campanula persicifolia*. *Kniphofia* 'Little Maid', a small, pale yellow poker, may be equally useful. Five-foot *Iris pseudacorus* is available in a soft, pale yellow cultivar, 'Bastardii'. The sharp chartreuse froth of lady's mantle, *Alchemilla mollis*, is thrilling with deep crimsons, and it self-sows anywhere in the garden without jarring. Some euphorbias have similarly agreeable yellow-greens.

Dark reds and crimsons are available in roses, and on a smaller scale in two of the longest-blooming perennials, a *Dianthus* cultivar that may be 'Napoleon III', and *Knautia macedonica*, with crimson pin-cushion flowers all summer.

Choosing plants for foliage ensures a garden that pleases before and after June's rosy exuberance. The sword-shaped foliage of some irises lasts throughout the season. The old perfume iris (*Iris* x *germanica* 'Florentina'), *Iris pseudacorus*, siberian iris, and a very few bearded iris cultivars have been good for me. Foliage with strong horizontal lines, whether from broad leaves or widely spreading mats, reassuringly anchors a mixed border. Bergenias, *Helleborus orientalis* and *Heuchera* 'Palace Purple' do this boldly; lambs' ears and pinks make year-round, edging mats.

Gray and gray-green foliage from artemisias, salvias, lambs' ears, pinks and from a woolly new favorite, *Marrubium cyl-leneum*, seems especially at home with old rose colors, but can also help to keep the peace among brighter hues. Kitchen sage has a purplish-leaved cultivar, *Salvia officinalis* 'Purpurascens', which is good with a pale pink old garden rose like 'Stanwell Perpetual', which has slightly gray foliage of its own.

Other rose foliage can add to such gray and purple schemes. Old garden roses in the alba class have leaves with a slight gray or blue-gray coating; they are also particularly resistant to blackspot and mildew. *Rosa glauca* is grown more for foliage (and late summer fruit) than for its fleeting, starry pink flowers. Given a little shade its grayish foliage suits the current Latin name; but the plant used to be *R. rubrifolia*, and it continues to show red-green or purplish foliage in the full sun it prefers.

There are a few more herbaceous companions to roses I would not like to miss. Little *Corydalis ochroleuca* seeds itself mildly. It has ten-inch, delicately ferny foliage, and ivory pendant flowers like small bleeding hearts from May through frost. Genuine bleeding hearts, like *Dicentra* 'Luxuriant', can bloom as long. My favorite has a shorter flowering period, but blue-gray foliage, and may be *D. formosa* var. *oregana* or a hybrid from it. These are all plants that appreciate a little shade. Their delicately cut foliage is a good foil for the roundness of rose leaves and flowers. Hardy geraniums, on the other hand, echo that roundness. I have mentioned their blues, but the best is *Geranium sanguineum* var. *striatum*, its pale pink flowers veined and netted with crimson. Its neat foliage gently weaves through the neighbors, with a sprinkling of flowers all season after a late May, early June peak. *Geranium macrorrhizum* makes an almost ever-green groundcover for a quiet carpet around larger shrubs, and has magenta flowers earlier in May, along with my latest-blooming daffodils.

I am as fond of daffodils as of roses, so I mingle them; but the yellowing daffodil foliage is not pretty during rose season. I try to tuck it among rising perennials. Tulips would be even worse, but carpets of early spring bulbs — chionodoxas, squills, snowdrops and so on — pose no problem. They accompany my first "rose" of the season, *Helleborus orientalis*, the Lenten rose. It nestles under shrubs, enjoying their summer shade. The late spring show is carried by irises, bleeding hearts and pinks.

True lilies rise up through roses and lower perennials and bloom, for me, as the first great flush of the roses fades. In any complex planting, tall, narrow plants like

the lilies can pop up through their neighbors without consuming space. The other great trick for extending bloom in limited space is to pile on vines. Most of my shrubs, including the roses, are supports for clematis that bloom with or following their hosts. Two favorite herbaceous clematis do not climb well without such shrubby support: native *Clematis versicolor* (small, leathery, nodding lavender flowers), and *C. x durandii*, which has wide-spreading violet sepals and a central boss of creamy stamens. Both of these scramble happily into short bushes.

Later in the season some of the roses get a second wind. They are joined by a new round of blues from platycodons, caryopteris, ceratostigma and salvias such as *S. azurea* var. *grandiflora* and *S. guaranitica*.

Small standards of *Hibiscus syriacus* 'Diana' and 'Helene' are still blooming at the end of summer — new roses-of-Sharon taking the place of some of June's once-blooming old garden roses. Old rose colors are reinforced by Japanese anemones and the dusty pinks of mallows and sedums. Gray foliage luxuriates in late summer and, like everything else, looks better in the lower, mellow sunlight.

In September I prefer this mature, end-of-summer scene to June's over-rosy abundance — but then, I needn't, perhaps, have planted so many roses. The mingling is the important thing, the community, the exchange, the diverse relationships among the plants. I am glad to have let the roses, and their neighbors, out of their asylums. ☼



PHOTOS BY AUTHOR

The roses above help anchor the perennial border, giving it a reason for being where it is.



Amsonia hubrechtii provides spectacular fall color. In the foreground is the silvery-gray foliage of *Stachys byzantina*.

HERBS AS ORNAMENTAL PERENNIALS

BY YVONNE ENGLAND

Herbs — their wide array of foliage colors and textures, showy flowers and bracts, delightful scents, architectural shapes, varying heights and glorious fall color — add ornamental value to any perennial border.

YVONNE ENGLAND is the proprietor of England's Herb Farm in Pennsylvania. Her garden was featured in *Beds and Borders* by Wendy B. Murphy, published by Houghton Mifflin in 1990.

Look beyond the many shades of green to the golden, pebbly-textured leaves of *Melissa officinalis* 'All Gold' (lemon balm) with their strong lemony fragrance. *Thymus* 'E. B. Anderson' and *Thymus* 'Gold Stream' create golden-green, variegated, ground-hugging mats of fragrance. All shine in shady nooks, and the cooler weather of late summer and fall intensifies their golden tones.

Ruta graveolens 'Blue Beauty' and the taller 'Jackman's Blue' (rue) introduce

bluish-gray to the garden while adding a delicate ferny texture. Both cultivars are strongly pungent. The small, flat, straplike leaves of *Allium senescens* var. *glaucum* (dwarf curled onion) repeat the glaucous foliage color of rue and are topped with small, pinkish, spherical flowers in late summer. Easily propagated by division, ornamental onions thrive in full sun with minimal care. *Asphodeline lutea* (king's spear) sends up three- to four-foot, erect, fragrant yellow spikes from basal clusters of blue-gray grassy leaves. Although very slow growing, it is stately and elegant.

Artemisias, *Stachys byzantina* (lamb's ear), hybrid perovskia (Russian sage) and *Marrubium incanum* (silver horehound) draw the eye to their silvery-gray foliage. The aromatic, silver, threadlike foliage of shrubby wormwoods such as *Artemisia absinthium* 'Lambrook Silver', *A. x* 'Powis Castle' and *A. splendens* grow easily in well drained soil in full sun. Adapting to a partly shaded area, *A. x latiloba* 'Valerie Finnis' with its almost entire-margined leaves grows erect but spreads by underground stolons. Low-growing *Stachys byzantina* 'Sheila McQueen' (cotton boll) and 'Silver Carpet' bring soft, wooly, velvety textures to sunny border edges. 'Sheila McQueen' has desirable white flowers, whereas 'Silver Carpet' is a nonbloomer. Both form dense mats. Tall, willowy hybrid *Perovskia* is shrubby. The lacy, filigreed, aromatic foliage is softly accented with lavender flowers that bloom in late summer. *Marrubium incanum* (silver horehound) is strikingly silver. A low-growing mound with rough-textured leaves on lax stems, it should be clipped to keep growth compact and dense.

Purple-foliage herbs contrast dramatically. Tall, tropical-looking *Angelica gigas* shoots up vivid purple six-foot stems which unfurl large, purple, spherical flower heads in summer.

Another umbellifer, *Foeniculum vulgare* var. *purpureum* (bronze fennel), has finely divided, deep purplish leaves. Even when the yellow flowers appear in late summer, the foliage remains bronze. Remove the seed heads to prevent self-seeding and grow in full sun. *Lysimachia ciliata* (bronze loosestrife), an old-fashioned herb, also has bronzy-purple basal rosettes in early spring, but upright mahogany stems with nodding yellow flowers appear in summer. It is easily grown in full sun and moisture-retentive soil.

Some of our decorative native American herbs are easy, disease and pest free, tolerant of damp soils and relatively maintenance free. Purple-stemmed Joe-pye weeds (*Eupatorium* spp.) tower over the herbaceous border, reaching up to eight feet bearing flat heads of fuzzy, rose flowers that bloom in late summer into fall.

The long slender spires of star-shaped blue flowers of *Camassia leichtlinii* (quamash) appear in spring. These edible bulbous plants produce the best spikes in sun or part shade. For full to partial shade, *Porteranthus trifolius* or Indian physic excels. This tough, self-reliant bushy plant has small, threadlike white flowers borne on the ends of reddish stems, so they are quite showy and flutter in the slightest summer breeze. The handsome cut foliage turns a stunning red in the fall, making it a valuable accent. *Veronicastrum virginicum* (Culver's root) sends long wands of tiny white flowers atop three- to five-foot erect stems in the summer. If dead-headed it will continue to bloom into fall. The whorls of foliage give a tidy, clean, distinctive appearance. Plant in drifts for the best show. The long linear leaves of *Amsonia hubrechtii* (blue dogbane) are also distinctive. This tidy clump-forming perennial blooms in the spring but its outstanding feature is its glo-

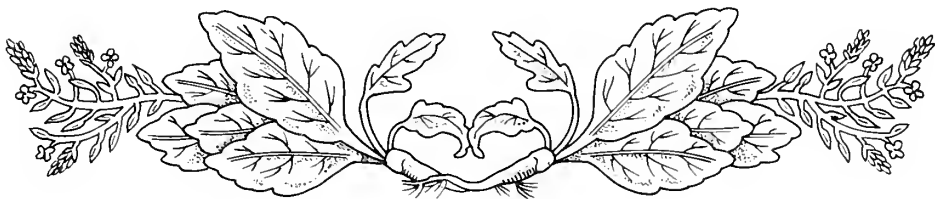
rious fall color. The graceful willowy wands turn brilliant yellow at the same time as sugar maple foliage, creating an elegant accompaniment.

The fragrant *Pycnanthemum* species (mountain mint) are also highly decorative natives. Erect clump-forming herbs, their mintlike aroma and clean green foliage enlivens the garden. Small terminal white flowers, sometimes pink, appear in mid-summer, but as the flowers fall the bracts become very prominent and showy, lasting into fall. Worthy of mention are *Pycnanthemum montanum* with green foliage tinged with maroon, *P. incanum* with very large showy bracts and *P. muticum* which seems to be dusted with confectioners' sugar. Anise-scented *Agastache foeniculum* has fat spikes of lavender-blue flowers topping every branch in late summer, while *A. nepetoides* (giant yellow hyssop) is distinctive for its six- to eight-foot height and striking, vertically ridged square stems which are revealed as the bottom leaves fall. Giant hyssop is a marvelously architectural plant.

There are many other showy flowering herbs. The flat dense heads of small white daisies of *Achillea decolorans* (garden mace) are long blooming, and its deliciously sweet-scented, tufted foliage is compact. The cloud of white honey-scented flowers regally hovering over the huge basal leaves of *Crambe cordifolia* (colewort) are magnificent. Reaching six feet

tall without staking, it is a sturdy back-of-the-border perennial. For the foreground, the densely bushy *Calamintha grandiflora* (showy savory) with its small, spicy-scented leaves and summer-blooming pink flowers has great charm. Another self-reliant calamint, *C. nepeta* (*C. nepetoides*) has dainty white flowers which create a long-blooming flowery mist. The plant is also pungently minty. The long-flowering blue flowers of *Nepeta sibirica* are carried on erect stems, and the foliage is pleasingly aromatic. Tidy, low-growing *Stachys macrantha* (big betony) has showy rosy-mauve flower whorls borne on erect stems above dark green furrowed leaves. The tall clump-forming *Artemisia lactiflora* (white mugwort) with erect tiny ivory flowers smelling of hawthorn makes a long-lasting show in late summer. It prefers moist soil. For shady moist nooks, *Astrantia major* (masterwort) bears white to pink flowers surrounded by a "collar" of bracts, producing a starlike effect.

"The leaves of the herbage at our feet," wrote John Ruskin, "take all kinds of strange shapes, as if to invite us to examine them. Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, in whorls, in tufts, in wreaths, in spheres, endlessly expressive, deceptive, fantastic, never the same from footstalks to blossom, they seem perpetually to tempt our watchfulness, and take delight in outstripping our wonder." ❀



ASTERS AND GRASSES

AND WHISKERS ON KITTENS, GOLDEN RODS, BONE SETS AND WARM WOOLEN MITTENS

BY CHRISTOPHER WOODS

I grew up in England, where fall, to paraphrase Keats, is the season of mists and mellow frightfulness. Cold rain and early frosts are enough to dampen the spirit of the hardiest gardener.

Coming to the United States and experiencing fall in New York and Pennsylvania restored my delight in the changing seasons and has helped me appreciate the beauty of fall foliage and the enchantment of growing herbaceous plants at the "back-end" of the year.

There are a number of herbaceous plants that are essential elements in the autumnal ornamental display. Both the New England aster (*Aster novae-angliae*) and the New York aster (*Aster novi-belgii*) decorate the meadows and roadsides of much of North America. The New England aster is a tall perennial growing to about five feet. The stems are hairy and the leaves are lance-shaped with the base of the leaf partly clasping the stem. The flower color is highly variable but most commonly in the purple to blue range. The list of *Aster novae-angliae* cultivars is extensive. Following is a brief description of a notable few. 'Alma

Potschke' demands to be seen with its vivid hot salmon-pink flowers and golden-yellow centers. It flowers at about three-and-a-half feet and is particularly effective in combination with the cooler colors of ornamental grasses. 'Barr's Pink' has semi-double cushions of bright rose-pink flowers that combine well with shrub roses putting on a late show of bloom.

Despite its lanky stems, I am very fond of 'Harrington's Pink'. It grows between four and five feet and has small daisies of soft pink that bloom for almost a month. 'September Beauty' is just that, an autumnal pleasure with crimson-purple flowers that seem to catch fire in the afternoon sun. Lastly, the deep lilac-blue flowers of 'Treasure' are always worth waiting for. It can get up to five feet tall and it is especially impressive with the dusky yellows of the goldenrods.

At times the tall stems of the New England asters can be difficult to deal with. They often need staking, and if the staking is not discreet there may be an uncomfortable display of bent bamboo canes topped with clusters of flowers. But these taller



The decorative rusty-brown seedheads of Joe-pye weed atop six-foot stems are perfect accompaniments to the tall white spikes of *Cimicifuga racemosa*.

asters can be pinched back in early summer to make them more compact. Staking may still be necessary but pinched once or twice, the plants are bushy and floriferous.

The New York aster and its cultivars are more easily used in the garden. This is fortunate as there seem to be an unending variety of forms and flower colors. So great is the disposition of the New York aster to produce a variety of flower colors that plant breeders have had a field day producing cultivated varieties with flowers from the brightest white to the darkest purple. It is a little embarrassing to realize that it was

largely European growers who took this native North American and produced the plants we now so admire. The yellow-centered daisies come in a dazzling range of purples, pinks and whites. The New York aster and its hybrids and cultivars are generally shorter than its New England relative, making it useful for the front and mid-sections of the border. A favorite few are: 'Alert' with arresting semidouble ruby-red flowers on one-foot stems; 'Bonnie Blue' with wisteria-blue flowers on bushy stems that only reach about eight inches in height; 'Bonningdale White' with large

double white flowers; 'Coombe Rosemary' with bright pinkish-purple double flowers; 'Freda Ballard' with single purple-blue flowers; and 'Professor Kippenburg' with masses of lavender-blue flowers.

The New York asters do not like soil that dries out in summer. That almost mythical ideal — moist but well-drained soil — suits them best. None but the tallest need staking, but a few cultivars suffer from powdery mildew. With so many good varieties that are less susceptible to disease, I have become intolerant with the poor performers and dig them out and burn them, replacing them with disease-resistant cultivars.

Asters are vigorous plants that grow quickly. Frequent division about every two or three years ensures that they do not spread too widely and that their vigor is maintained. As there are nearly 600 species, many of them blooming late in the season, choosing just two is limiting. Other fall-blooming asters that are well worth growing include *A. divaricatus*, the white wood aster, with sharply serrated leaves on black stems and heads of one-inch-wide white daisies with brown centers. It is a common sight in the woodlands of eastern North America and is valuable for its ability to grow and flower in dry soil and the substantial shade of deciduous trees.

The prairie aster, *A. ericoides*, is a joy with its clouds of tiny white flowers on sprawling three-foot-high stems. There are at least a couple of cultivars worth looking out for: 'Blue Star' with icy-blue flowers, and 'Ringdove' with white daisies tinged pink. *A. lateriflorus* has tiny white or pale lilac flowers that are borne in clusters along one side of the stem. The variety *horizontalis* is an increasingly popular form with white flowers lying horizontally along the stem.

Unlike the asters mentioned above, *A. spathulifolius* is a low-growing, carpeting

species with spoon-shaped leaves and two-inch-wide yellow-centered, pinkish-white flowers that bloom in late summer and into fall. It is a relatively recent introduction from Korea and an excellent plant for the rock garden or dry stone wall. Its opposite is *A. tartaricus*, with spoon-shaped basal leaves that can reach up to two feet long. Loose sprays of pinkish-blue daisies are borne atop six-foot stems.

One of the most beautiful sights of autumn is the meadows of asters and goldenrods blooming together. The goldenrods, *Solidago* species, are wonderful garden plants too. Most of the approximately 130 species are medium to tall with panicles of small golden-yellow flowers. Many hybrids have been bred and some of them are superior to the species. Unfortunately, there has been a tendency among growers to produce smaller and smaller plants until their graceful, willowy nature becomes stunted and a little absurd. 'Tom Thumb', a cultivar that grows to about eight inches topped with a dense panicle of dusky yellow flowers often accompanied by mildewed leaves, is especially worthless.

It is the elegance of goldenrods that we should admire. Perhaps their stiff, alternate-leaved stems are not so ornamental but they can be hidden at the back or middle of a border amidst other plants such as asters, their billowing flowers dancing above. *Solidago* species such as *S. canadensis*, *S. rugosa* and *S. speciosa* grow from three to eight feet and have arching pyramidal clusters of golden yellow flowers. *S. caesia* has three-foot stems and small panicles of yellow flowers borne in the leaf axils. It is shade tolerant and has a handsome habit of producing branched stems with the tight flower clusters blooming along it. *S. odora* has anise-scented, narrowly lance-shaped leaves and long-bloom-

ing one-sided panicles of flowers. It grows in dry soil. One of the most ornamental goldenrods is 'Golden Fleece', a cultivar of *S. sphacelata*. A bushy plant growing to about three-feet high, it produces masses of golden yellow flowers along the top third of its stems. It is a perfect companion to the smaller New York aster cultivars.

There are a number of other hybrids and cultivars of varying degrees of merit. 'Cloth of Gold' has deep yellow flowers and grows to about 18 inches. 'Golden Mosa' has feathery panicles on two to three foot stems and is a deservedly popular selection. 'Peter Pan' is a rather stiff plant growing to about three feet with almost triangular flower clusters.

Not only are goldenrods the perfect companions to the fall-blooming asters but they are almost flawless when mixed with the taller ornamental grasses. Much has been said and written about eulalia grass, (*Miscanthus sinensis*). Despite its ubiquity it is a highly desirable plant both for its foliage and for its late summer and fall-blooming flowers. *Miscanthus* cultivars are widely available and there are a few that are unusually beautiful. I am becoming increasingly fond of 'Morning Light' with its light green leaves with a white central stripe and thin creamy-white edges. Although it can reach a height of five feet, it rarely needs staking. 'Cabaret' is a carnival plant with a clown's coloring of dark green leaves with a broad central stripe of creamy white. The coppery-purple flowers appear in early fall. 'Malepartus', despite a somewhat unfortunate name, is a handsome cultivar with arching leaves that turn burgundy, and copper-colored flowers that turn white and feathery.

The bone sets or Joe-pye weeds are another valuable example of late-flowering plants. The common bone set, *Eupatorium*

perfoliatum, is a moisture-loving plant with large, flat heads of greenish-white flowers on stems up to five feet from late summer to mid fall. The sharply tapering gray-green leaves can reach up to eight inches long with the base of the leaf completely surrounding the stem like the spokes around an umbrella. It is not commonly grown in gardens here — a great pity, as its quietly cool ornamentation is a wonderful foil for more stridently colored plants. It was once widely used by Native Americans as a medicinal herb to cool the fevers of a form of influenza described as break-bone fever.

Eupatorium hyssopifolium is another plant with discreet charm. It grows to about two feet high and has linear leaves arranged in angular whorls around the stem. Platelike clusters of off-white flowers appear in late summer and fall. This species is found in nature growing along the edges of woodland, usually in poor soil, making it a useful plant for shaded areas in the garden.

The hardy ageratum, *E. coelestinum*, despite its tendency to be invasive, is an extremely attractive plant for the fall garden. The blue-violet flowers are borne in compact clusters from late summer to mid fall. Because it grows to about two feet it is a highly effective foil for the less than appealing lower portions of taller fall bloomers. 'Wayside Variety', a smaller form growing to about 15 inches, appears to be no less invasive than the species. Personally, I like the rampant growth of hardy ageratum. Despite its predilection for moist to wet soils, it grows well in poor, dry sites, blooming regularly without a great deal of care. It is truly a "blue-collar" plant.

The tall Joe-pye weeds have been described elsewhere in this handbook. It is the sun-loving species, *E. fistulosum* and *E. maculatum*, that appeal to me. They bloom in late summer but continue to be attrac-

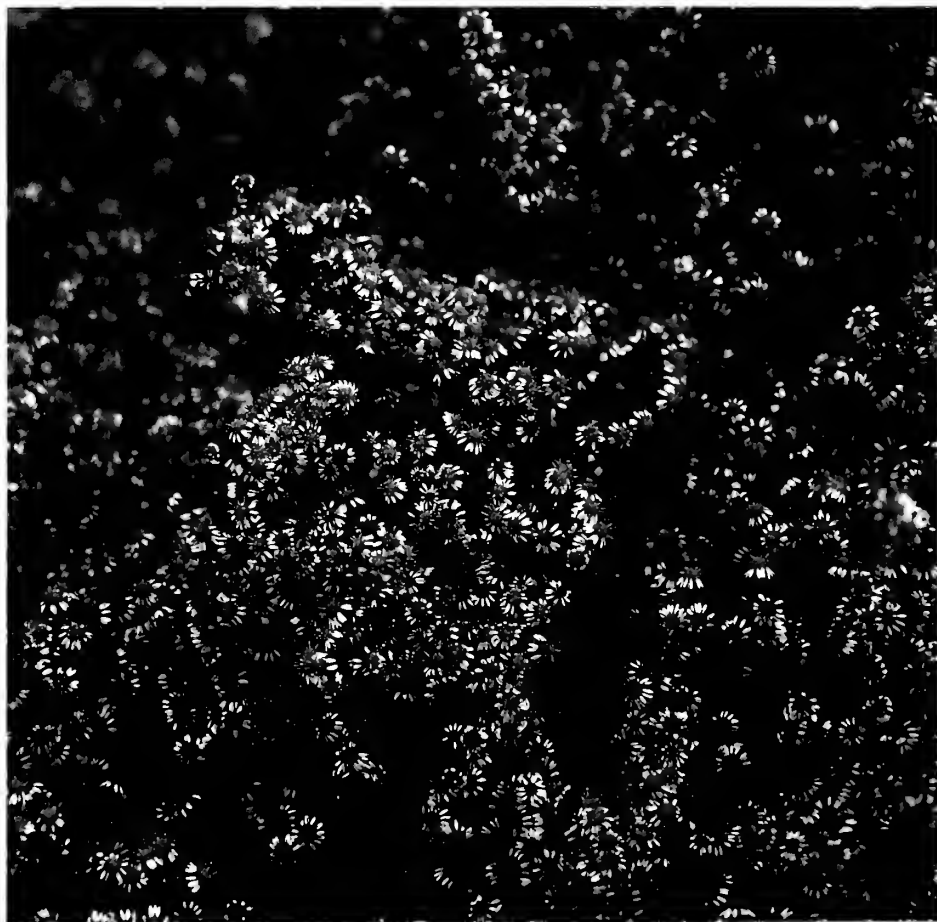
tive when their domed heads of reddish-purple flowers turn to seed, producing decorative clusters of rusty-brown. These round heads at the top of six-foot stems are perfect accompaniments to the tall white spikes of *Cimicifuga racemosa* or the arching white candles of *Cimicifuga simplex* 'White Pearl'.

Fall is an exciting time to be gardening. The herbs have recovered from the ravages of the summer, the lawns are green again and the air sparkles with freshness.

It is a time for life before the winter calls us in.

To quote Vita Sackville-West:
"There reigns a rusty richness everywhere;
See the last orange roses, how they blow,
Deeper and heavier than in their prime,
In one defiant flame before they go;
See the red-yellow vine leaves, how they climb

In desperate tangle to the upper air;
So might a hoyden gypsy toss and throw
A scarf across her disobedient hair."



The increasingly popular *Aster lateriflorus horizontalis* has white flowers which lie horizontally along the stem.

SPRING-FLOWERING WOODLAND PHLOX

BY CHRISTOPHER WOODS

In his wonderful book on wildflowers, *How to Grow Wildflowers and Wild Shrubs and Trees in Your Garden*, Hal Bruce describes *Phlox divaricata* as having "masses of misty lavender-blue flowers" and writes further, "I cannot think of any spring wildflower with which I would be more reluctant to part than the Wild Blue Phlox."

Although we tend to take our wildflowers for granted, the sight of a profusion of blue phlox carpeting a woodland floor cannot help but delight us. Blue phlox is just one of the spring-flowering plants that grow so well in the woods of eastern and central North America. We suffer an embarrassment of riches with spring wildflowers, not the least being the many phlox that grace our woodlands.

The wild blue phlox, *Phlox divaricata*, does indeed have lavender-blue flowers. They are fragrant and have five slightly lobed petals. The flowers are borne on 12-inch-high flower stalks above spreading mats of trailing stems with opposite, dark green, oblong leaves. The stems often root themselves as they trail along the ground, slowly colonizing the area. 'Fuller's White' is an excellent cultivar that is more compact than the species and has white flowers

with conspicuously notched petals. Another good cultivar is 'Dirigo Ice', with pale icy-blue flowers. 'Spring Delight' has rose-pink flowers and deep green rounded leaves, blooms on 12- to 15-inch stems and prefers light shade. It is possibly a hybrid

PHOTOS BY AUTHOR



Phlox 'Moody Blue', a relatively new introduction, does best in moist, well drained soil.

with the mountain phlox, *P. ovata*.

A subspecies, *P. divaricata laphamii*, is a native of the western United States and has dark blue flowers without lobed petals. *P.* 'Moody Blue', formerly known as *P.* 'Chattahoochee', was thought to be a hybrid between *P. divaricata laphamii* and the downy phlox, *P. pilosa*. It is now regarded as a form of *P. pilosa* ssp. *fulgida*.

P. 'Moody Blue' is a relatively recent introduction with dark green leaves and lavender-blue flowers with a purple eye. It is not as vigorous as the downy phlox but is a fine plant — particularly when grown in the moist, well drained soil of a woodland or shrub border. In dry soils it is susceptible to powdery mildew.

The creeping phlox, *P. stolonifera*, is another choice species. It is similar to the wild blue phlox but does not get as tall and has round tipped leaves rather than the pointed leaves of *P. divaricata*. It, too, spreads itself by means of rooting stems, and has lavender-blue, unlobed flowers that are produced on six- to eight-inch-long flower stalks. There are a number of fine cultivars, particularly 'Blue Ridge' with sky-blue flowers, 'Bruce's White' with bright white flowers with a central yellow eye, and 'Pink Ridge', with pink flowers. Perhaps the best cultivar is 'Sherwood Purple', a vigorous form with purple-blue flowers on six-inch flower stalks. 'Sherwood Purple' is a spectacular plant when grown in a large mass in a partly shaded area. If the spring is not too warm, flowering lasts almost a month. All the trailing phlox are easy to propagate, and 'Sherwood Purple' may well be the easiest. Clumps can be lifted and divided into a great many tiny plants not much bigger than rooted cuttings. These can be

planted out and, if care is taken to water them the first couple of weeks, they will quickly establish themselves and proliferate.

P. stolonifera and its varieties are outstanding groundcovers for deep shade, although they will flower best in partial shade. Planted in very dry soil, they become weak. Their preference is that best-of-all-possible soils, moist but well drained.

P. stolonifera has been crossed with the moss phlox, *P. subulata*, to produce a hybrid strain, *P. x procumbens*. This hybrid flowers at about 10 to 12 inches high, prefers full sun or light shade and produces saucer-shaped purple flowers above a cushion of glossy, dark green, elliptic leaves. Two cultivars are widely available at present but this hybrid should be watched for further development. 'Millstream' ('Millstream Daphne') has mauve-pink flowers with a dark mauve eye surrounded by a central white circle. 'Folio Variegata' ('Variegata') has bright pink flowers and dark green leaves edged with gold.

As groundcovers, the varieties described here are ridiculously easy to grow, easy to propagate and, in most cases, free of pests and diseases. Of course, as gardeners, we prefer to cultivate the summer-blooming garden phlox, *P. paniculata*, which suffers from powdery mildew and the attentions of spider mites, needs dividing every two to three years and requires staking throughout the summer. We ignore the plants at our feet and fret over the plants in our mind's eye. It is time the spring-flowering phlox came into their own. They have been busy without us; it is time we caught them up. ❁

ADAPTED FROM AN ARTICLE PUBLISHED IN *THE HYBRID*, THE NEWSLETTER OF THE SCOTT ARBORETUM OF SWARTHMORE COLLEGE, PA.

WHOLESALE AND RETAIL NURSERIES

BY ERICA GLASENER

Below is a list of wholesale and retail nurseries that feature perennials, including some that specialize in herbs and native plants. The dollar amount listed refers to the cost of the catalog, and "DFO" means that this amount will be deducted from your first order. Unless indicated, all of the nurseries listed ship through parcel post or United Parcel Service.

AMBERGATE GARDENS

8015 Krey Ave.
Waconia, MN 55387
612-443-2248
Retail and Wholesale, \$1.00

ANDRE VIETTE FARM

and Nursery (1930)
Route 1, Box 16
Fishersville, VA 22939
703-943-2315
Retail and Wholesale, \$2.00

AQUA FRIA NURSERY

1409 Aqua Fria
Sante Fe, NM 87501
(505) 938-4831

ERICA GLASENER is a horticulturist and freelance writer. She was Education Coordinator at the Scott Arboretum in Swarthmore, PA, for more than eight years.

BLUEMOUNT NURSERIES (1926)

2103 Blue Mount Rd.
Monkton, MD 21111
301-329-6226
Wholesale

BLUESTONE PERENNIALS (1972)

7211 Middle Ridge Rd.
Madison, OH 44057
800-852-5243 Retail

BUSSE GARDENS (1977)

Route 2, Box 238
Cokato, MN 55321
612-286-2654
Retail and Wholesale, \$2.00, DFO

CANYON CREEK

Nurseries (1986)
3527 Dry Creek Rd.
Oroville, CA 95965
916-533-2166
Retail, \$1.00 (unusual perennials)

CARROLL GARDENS (1933)

P.O. Box 310 Westminster, MD 21157
800-638-6334
Retail and Wholesale, \$2.00, DFO

CROWNSVILLE NURSERY (1979)

P.O. Box 797 Crownsville, MD 21032
301-923-2212 Retail, \$2.00, DFO

FOXHILL FARMS (herbs)

440 West Michigan Ave. P.O. Box 19
Parma, MI 49269
517-531-3179 Retail, \$1.00

GOODNESS GROWS

P.O. Box 311 Lexington, GA 30648
404-743-5055
Retail and Wholesale

GREENLEAF ENTERPRISES

17 W. Main St. Leola, PA 17540
717-656-2606 Wholesale

HOLBROOK FARM AND NURSERY (1980)

115 Lance Rd. P.O. Box 368
Fletcher, NC 28732
704-891-7790 Retail, \$2.00, DFO

KURT BLUEMEL INC. (extensive selection of ornamental grasses)

2740 Green Ln.
Baldwin, MD 21013
301-557-7229
Retail and Wholesale \$2.00

MILAEGER'S GARDENS

4838 Douglas Ave. Racine, WI 53402
414-639-2371 Retail

MONTROSE NURSERY (1984)

(features hardy cyclamen species from seed)
Box 957 Hillsborough, NC 27278
919 732-7787 Retail, \$2.00

NATIVE GARDENS (1983)

Route 1, Box 494
Greenback, TN 37742
615-856-3350
Retail and Wholesale, \$2.00

NICHE GARDENS (1985)

1111 Dawson Rd.
Chapel Hill, NC 27516
919-967-0078
Retail and Wholesale, \$3.00

NORTH CREEK NURSERIES INC. (native

perennials) RR 2 Box 33
Landenberg, PA 19350
215-255-0100 Wholesale

PLANTS OF THE SOUTHWEST

930 Baca Street Santa Fe, NM 87501
505-327-9123

PRAIRIE NURSERY (native perennials)

Box 306 Westfield, WI 53964
608-296-3679 Retail, \$3.00

RICE CREEK GARDENS INC. (1972)

1315 66th Ave. NE
Minneapolis, MN 55432
612-574-1197 Retail, \$2.00

ROCKNOLL NURSERY (1928)

1639 Hess Rd. Sardinia, OH 45171
513-288-2304 Retail, \$1.00

SANDY MUSH HERB NURSERY

Route 2, Surret Cave Rd.
Leicester, NC 28748
704-683-2014 \$4.00, catalog is also a useful handbook, DFO

SISKIYOU RARE PLANT NURSERY (1964)

2825 Cummings Rd.
Medford, OR 97501
503-772-6846 Retail, \$2.00 DFO

SHADY OAKS NURSERY (1983)

700 19th Ave. NE; Waseca, MN 56093
507-835-5033; Retail and Wholesale,
sale, call for current catalog price

SOUTHWEST NATIVE SEEDS

Box 50503; Tucson, AZ 85703
704-738-8300

SUNLIGHT GARDENS (1982)

Rt. 1, Box 600-A; Hillvale Rd.
Andersonville, TN 37705
615-494-8237
Retail and Wholesale, \$2.00, DFO

SUNNY BORDER NURSERIES, INC.

P.O. Box 86; 1709 Kensington Rd.
Kensington, CT 06037
203-828-0321; Wholesale

WALTERS GARDENS

P.O. Box 137 Zeeland, MI 49464
800-421-0333; Michigan residents
616-772-4697 Wholesale Only

WAYSIDE GARDENS (1975)

Garden Lane; Hodges, SC 29695-0001
800-845-1124 Retail

WE-DU NURSERIES (1981)

(southeastern natives and Asian plants)
Route 5, Box 724
Marion, NC 28752; 704-738-8300
Retail, \$2.00, DFO

WELL-SWEEP HERB FARMS (herbs,

nursery and display garden)
317 Mount Bethel Road
Port Murray, NJ 07865
201-852-5390; Retail, \$2.00

WESTERN HILLS RARE PLANT NURSERY

16250 Coleman Valley Rd.
Occidental, CA 95465
707-874-3731
No mail order, Retail

WHITE FLOWER FARM (1949)

Route 63; Litchfield, CT 06759
203-567-0801; Retail, Call for current
catalog price 800-678-5164

WOODLANDERS, INC. (1980)

(native plants)
1128 Collecton Ave.
Aiken, SC 29801
803-648-7522; Retail, \$1.00

CHRISTOPHER WOODS



A mixed border.

PERENNIAL GARDENS

BY ERICA GLASENER

Below is a sampling of public gardens across the United States and Canada which include many of the plants described in this handbook. This partial list is intended to highlight a variety of gardens with significant displays of perennials or herbs or both.

Fee indicates those gardens which charge an admission. For current prices and information about hours, write or call the address or phone number listed.

ATLANTA BOTANICAL GARDEN

P.O. Box 77246
Atlanta, GA 30357
404-876-5859 (perennials, herbs
and rock garden). Fee

THE ARBORETUM AT FLAGSTAFF

South Woody Mountain Road
P.O. Box 670
Flagstaff, AZ 86002
602-774-1441

BEAL BOTANIC GARDEN

Michigan State University
East Lansing, MI 48824
517-355-9582 (perennials)

BOERNER BOTANICAL GARDENS

5879 S. 92nd St.
Hales Corners, WI 53130
414-425-1130 (perennials and herbs)

BOTANICA (The Wichita Gardens)

701 Amidon
Wichita, KS 67203
316-264-0448. Fee

BROOKLYN BOTANIC GARDEN

1000 Washington Ave.
Brooklyn, NY 11225
718-622-4433 (herbs and perennials)

BROOKSIDE GARDENS

1500 Glenallan Ave.
Wheaton, MD 20902
301-949-8230 (walled perennial garden and herbs)

CHANTICLEER

786 Church Road
Wayne, PA 19087
Open to horticultural groups by
appointment only. Fee

THE CLOISTERS

Fort Tryon Park, NY 10040
212-923-3700
(herb garden). Fee

CORNELL PLANTATIONS

One Plantations Rd.
Ithaca, NY 14850
607-255-3020 (perennials and herbs)

CRANBOOK GARDENS

P.O. Box 801 380 Lone Pine Road
Bloomfield Hills, MI 48013
313-645-3149 (perennials). Fee

DENVER BOTANIC GARDENS

909 York St.
Denver, CO 80206
303-331-4000 (rock garden and
herb garden). Fee

FILOLI CENTER

Canada Rd.
Woodside, CA 94062
415-364-2880 (perennials). Fee

GARDEN IN THE WOODS

New England Wildflower Society
Hemenway Rd.
Framingham, MA 01701
617-237-4924 (native perennials). Fee

GARDEN CENTER OF GREATER CLEVELAND

University Circle 11030 East Blvd.
Cleveland, OH 44106
216-721-1600 (perennials and exten-
sive herb garden)

HUNTINGTON BOTANICAL GARDENS

1151 Oxford Rd
San Marino, CA 91108
818-405-2160 (perennials and herb
garden). Fee

LEWIS GINTER BOTANICAL GARDEN

P.O. Box 28246
Richmond, VA 23228-4610
804-262-9887 (perennials) Fee

LONGWOOD GARDENS

P.O. Box 501
Kennett Square, PA 19348-0501
215-388-6741
(perennials and herbs). Fee

MEMPHIS BOTANIC GARDEN

750 Cherry Rd.
Memphis, TN 38117-4699
901-685-1566 (perennials). Fee

HORTICULTURAL DEMONSTRATION GARDENS

Michigan State University
East Lansing, MI 48824
517-355-0348 (perennials)

MINNESOTA LANDSCAPE ARBORETUM

3675 Arboretum Drive Box 39
Chanhassen, MN 55317
612-443-2460
(perennials and herbs). Fee

MISSOURI BOTANICAL GARDEN

P.O. Box 299
St. Louis, MO 63166-0299
314-577-5100 (perennials). Fee

**MT. CUBA CENTER FOR THE STUDY OF
PIEDMONT FLORA**

P.O. Box 3570 Greenville, DE 19807
302-239-4244 (native perennials)
Open to professionals or horticultural
groups by appointment only

NEW YORK BOTANICAL GARDENS

Southern Blvd.
Bronx, NY 10458-5216
212-220-8700 (rock garden, herbs
and perennials) Fee

NORTH CAROLINA STATE UNIV ARBORETUM

Department of Horticultural Science
Box 7609 Raliegh, NC 27203
919-737-3132 (perennials)

OLD WESTBURY GARDENS

P.O. Box 430
Old Westbury, NY 11568
516-333-0048 (formal walled peren-
nial garden). Fee

RED BUTTE GARDENS AND ARBORETUM

University of Utah
Salt Lake City, UT 84112; 801-581-5322

ROYAL BOTANICAL GARDENS

P.O. Box 399
Hamilton, ON L8N 3H8 Canada
416-527-1158
(perennials and herbs). Fee

STRYBING ARBORETUM & BOTANICAL

GARDEN; 9th Ave. and Lincoln Way
San Francisco, CA 94122
415-661-1316 (perennials and herbs)

U.S. NATIONAL ARBORETUM

(The National Herb Garden)
3501 New York Ave. NE
Washington, DC 20002; 202-475-4815

**UNIVERSITY OF BRITISH COLUMBIA
BOTANICAL GARDEN**

6804 S.W. Marine Dr.
Vancouver, BC V6T 1W5
Canada
604-228-4186 (Physick garden af
herbs, rock garden). Fee

**UNIVERSITY OF CALIFORNIA-BERKELEY
BOTANICAL GARDEN**

Centennial Drive
Berkeley, CA 94720
415-643-8040 (herbs and perennials)

WAVE HILL

675 West 252 St.; Bronx, NY 10471
212-549-2055 (herbs and extensive
collection af perennials)
Fee charged on weekends only

For more information on where to see perennials, consult *A Guide to Herbaceous Perennial Gardens in The United States and Canada*. Published by the Perennial Plant Association in 1990, this guide includes information on 300 different gardens, 24 of them in Canada. This publication is available only to PPA members. For information about membership write to the Perennial Plant Association, Attn: Dr. Steven M. Still, 3383 Schirtzinger Rd., Hilliard, OH 43026; or call 614-771-8431.

For more information about where to see herb gardens, consult the 2nd addition (1988) of *A Travelers' Guide to Herb Gardens*, which covers over 500 gardens in the U.S. and Canada. For a copy, send \$3.75 plus \$1 postage to The Herb Society of America, National Headquarters, 9019 Kirkland-Chardon Rd., Mentor, OH 44060; or call 216-256-0514.

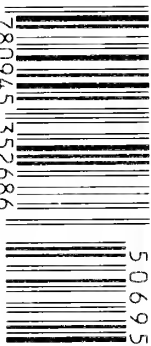


Helen Dillan's Dublin garden.

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THE WINTER GARDEN

BROOKLYN BOTANIC
GARDEN RECORD

PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD



THE WINTER GARDEN

1991



Brooklyn Botanic Garden

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THE WINTER GARDEN

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The Osborne Section at the Brooklyn Botanic Garden
with a frosting of ice and snow.

FOREWORD

W inter has its pleasures — the crunch of snow underfoot, the occasional glazing of ice on leaves and branches, the heady bouquet of a hot toddy. For most gardeners, winter is a time to retire before a crackling fire and make do with the promise of nursery catalogs and the return of spring.

But with a bit of attention, the winter garden can be a place of wonder. To quote Elizabeth Lawrence from her book *Gardens in Winter*, "To be pleasant in winter a garden needs more than trees and shrubs and a green carpet. It must have brick and stone to catch and hold the warmth of the sun, a wall or hedge against the north, and dry pavement underfoot. There may be flowers, and even a momentary splendor when the mume [Japanese flowering apricot] reaches perfection against the pale blue of a January sky, but in winter more than any other season, plants need the support of good design and a well ordered pattern."

When designing the winter garden, think about the view from the inside looking out, including the vistas beyond the

boundaries of your garden. Choose carefully those plants not only around windows but also doorways and well travelled walks. Evergreens are effective but should not be overdone. In *The Garden in Winter*, Rosemary Verey recommends that you have a corner in your winter garden, "however small, where you can be sure of finding those special flowers that brave the weather, those leaves that keep their colour and those berries that hang on through the winter days. And it should be tucked away so that you have a positive inducement to walk out of the house..."

Ms. Verey also writes that "Winter colour is nature's most sophisticated palette — a range dominated by subtle tones, sombre contrasts and striking highlights. For the winter gardener, the challenge is to enhance and build upon this mellow array."

May this collection of articles inspire you to plant for winter interest or to add a winter corner to your existing garden where you can enjoy the special fragrances, colors and textures of this often overlooked season.

ERICA GLASENER

GUEST EDITOR



THE BARE ESSENTIALS

BY GARY L. KOLLER

For most people winter is a time to plan the spring and summer garden. During autumn when frosts arrive and the lush display of summer is just a memory, many gardens become drab and lifeless. With careful planning, the winter garden can have its own visual pleasures.

What can you do to enhance the visual pleasures of your winter garden? Once flowers fade and leaves fall the landscape is distilled to its bare essentials. Consequently, my first suggestion is that you take a hard look at your garden's bones — its underlying design, walls, hedges, pathways and outstanding plant specimens and other focal points. Take walks along neighborhood streets and through parks and natural areas in search of ideas, or

visit gardens at this time of year when their bones are most evident. Garden clubs and plant societies rarely take winter garden tours, but much could be gained if they did.

A good place to start improving the winter garden is the view from a favorite window. During the summer we tend not to look outward to the landscape as frequently or for as long as we do in winter. Or, you can convert a summer scene which you largely ignore to a winter picture whose beauty and form lasts for weeks or months. But you don't have to stop there. It is possible to improve design throughout the garden to make it more appealing in winter.

Walls and Garden Structures

In winter garden walls, fences, pergolas, latticework and other structures are revealed in all their splendor — or squalor, as the case may be. Stone walls, for example, which are largely hidden in summer, become dominant visual features once the foliage is cut back. Walls are especially

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beautiful with a frosting of ice and snow, as the remains of herbaceous plants glisten and cast shadows.

In summer, garden structures are often simply props for plants. But in winter, they themselves become the focal points. If the design of your garden structures leaves much to be desired, improving them can make a dramatic difference in the winter garden. Sometimes all that is needed is a bit of tender loving care; a new coat of paint can work wonders.

Many homes and associated structures have large, blank walls — ideal candidates for imaginative horticultural treatment. Consider taking a stiffly upright tree with a distinctive branching structure, such as the fastigiata goldenrain tree (*Koelreuteria paniculata* 'Fastigiata') or the columnar sugar maple (*Acer saccharum* 'Columnare') and planting it as an accent piece far enough away from the wall to cast shadows on it. Or consider espaliering a winter-blooming shrub like witch-hazel against a wall or undistinguished fence.

Organization of Space

In winter how you organize space in the garden is most apparent. The mix of deciduous and evergreen plants may lack visual unity, spatial organization or flow. Have you ever visited a garden which works wonderfully during summer but fails spatially as a wintertime composition? Many gardeners assume that evergreens are the cure-all for the winter garden, the more the better. But I have been in several gardens which were evergreen or largely evergreen and look somber, cold and drab in the wintertime. What looks more pitiful than a rhododendron with its leaves curled? Also, a preponderance of evergreens will mean that there is little change between the summer and winter garden. I find it exciting to

anticipate the change which results from having a judicious mix of evergreens, deciduous plants and herbaceous perennials. But as the change unfolds I still want the components to work together at each season.

Observe the unoccupied, or negative, spaces between the buildings, the plantings and other "positive" elements such as walls, fences and garden ornaments. How do the positive elements relate to the negative spaces? Is there a feeling of cohesiveness and design flow? Are all the elements integrated into a spatial image which transcends any one component and becomes a part of the whole?

During the dormant season the absence of foliage on trees and shrubs reveals views obscured in summer. If the view is good, you might enhance it by removing plants, artfully pruning or restructuring the plantings by moving or adding plants.

If winter reveals objectionable views you may also want to group the plantings. Tall, thin plants are useful as visual barriers. One example I recall distinctly was a house which looked out on a beautiful garden. But just beyond a three-story house loomed over the garden. A hedge of 20-foot-tall white pines (*Pinus strobus* 'Fastigiata') was planted at the property edge to enclose the garden and create an open screen which diminished the neighboring house's imposing presence. But keep in mind that any changes you make to enhance the winter garden should not detract from the summer garden.

Plant Form

Many of the techniques for good composition used in the summer garden are of equal use in the winter garden, such as height, form, texture and color.



Height, form, texture, color and other elements of good composition are as important in the winter garden as in the summer garden.



Once flowers fade and leaves fall, a garden is distilled to its bare bones — walls, hedges, pathways and outstanding plant specimens.

In this Northwest winter garden, red- and yellow-flowering witch-hazels are framed by clipped box hedges.

As leaves fall each autumn, poor pruning and less-than-scrupulous maintenance become ever more obvious. Foundation and border plantings drop their leaves to expose maimed and brutalized thickets of twigs resulting from inept, inappropriate or uninformed pruning. Even if they haven't been brutalized by poor pruning, existing plants can be made more sculptural and artistic if they are thinned to enhance line and form. Indeed, much of what makes a Japanese garden beautiful is the skillful pruning and the attention lavished on individual plants. Evaluate your existing plants for such opportunities.

Herbaceous plants also create artistic forms in the winter garden. As a student of

horticulture, I was told that once frost reigned upon the land you were supposed to rush out and prune things back, tidy up and mulch before winter set in. I have since discovered that many of the herbaceous perennials look just as lovely in the winter landscape as in the summer as their foliage turns beige, brown, maroon and silver and their interesting seed structures become more apparent. These rich, warm tones relieve the drab grays, dark browns and monotonous greens of the typical winter garden. Now, many of the same plants I used to chop back with abandon remain in place until I find them unattractive. Allowing plants to remain adds bulk, mass and height to the ground plane and keeps the

SELECT PLANTS FOR THE WINTER GARDEN

WEeping AND CONtORTED

Abies alba 'Pendula'
Acer palmatum 'Viridis'
Acer palmatum 'Waterfall'
Betula pendula 'Gracilis'
Caragana arborescens 'Pendula'
Cedrus atlantica 'Glauc Pendula'
Cercidiphyllum japonicum 'Pendula'
C. magnificum 'Pendulum'
Chamaecyparis nootkatensis 'Pendula'
Corylus avellana 'Contorta'
Fagus sylvatica 'Pendula'
F. sylvatica 'Tortuosa'
Juniperus rigida 'Pendula'
Larix decidua 'Pendula'
L. x eurolepis 'Vaned Directions'
Morus alba 'Pendula'
M. bombycis 'Unryu'
Picea abies 'Inversa'
P. abies 'Pendula'
P. breweriana
P. omorika 'Pendula'
P. pungens 'Pendula'
Pinus strobus 'Pendula'
Prunus subhirtella 'Pendula'
Pseudotsuga menziesii 'Pendula'
Salix alba 'Tristis'
S. matsudana 'Tortuosa'
Sequoiadendron giganteum 'Pendulum'
Sophora japonica 'Pendula'
Styrax japonicus 'Pendula'
Thuja occidentalis 'Pendula'
Ulmus glabra 'Camperdownii'
U. glabra 'Pendula'

FASTIGIATE AND NARROWLY UPRIGHT

Abies alba 'Pyramidalis'
Acer platanoides 'Columnare'
A. platanoides 'Crimson Sentry'
A. rubrum 'Columnare'
A. platanoides 'Erectum'
A. saccharum 'Columnare'
A. saccharum 'Monumentale'
Betula pendula 'Fastigiata'
Calocedrus decurrens (Columnar in northern part of range)
Cedrus atlantica 'Fastigiata'
Chamaecyparis lawsoniana 'Allumii Magnifica'
C. lawsoniana 'Columnaris'
C. lawsoniana 'Fletcheri'
C. nootkatensis 'Green Arrow'
C. thyoides
Cryptomeria japonica
Cupressus sempervirens 'Stricta'
C. sempervirens 'Swane's Golden'
Fagus sylvatica 'Dawyckii'
(F. sylvatica 'Fastigiata')
Ginkgo biloba 'Sentry'
Juniperus chinensis 'Columnaris'
J. chinensis 'Columnaris Glauca'
J. scopulorum 'Skyrocket'
J. scopulorum 'Sparkling Skyrocket'
Koelreuteria paniculata 'Fastigiata'
Malus baccata 'Columnaris'
M. 'Van Eseltine'
Picea omorika
P. orientalis
Pinus strobus 'Fastigiata'

P. sylvestris 'Fastigiata'
P. sylvestris 'Sentinel'
Papulus alba 'Pyramidalis'
P. nigra 'Italica'
Prunus sargentii 'Calumnaris'
Pyrus calleryana 'Capital'
Quercus rabur 'Fastigiata'
Taxadium ascendens
Taxus baccata 'Fastigiata'
Thuja occidentalis 'Hetz Wintergreen'

COLORFUL WINTER FOLIAGE

Abies concolor 'Candicans'
A. kareana 'Aurea'
A. lasiocarpa 'Glaucua'
A. pinsapa 'Glaucua'
A. procera 'Aurea'
A. procera 'Glaucua'
Buxus sempervirens 'Variegata'
Calluna vulgaris (cultivars)
Cedrus atlantica 'Aurea'
C. atlantica 'Glaucua'
C. deodara 'Klandike'
Chamaecyparis lawsoniana 'Minima Aurea'
C. lawsaniana 'Pembury Blue'
C. nootkatensis 'Aurea'
C. naotkatensis 'Glaucua'
C. naotkatensis 'Variegata'
C. obtusa 'Aurea'
C. obtusa 'Crippsii'
C. obtusa 'Mariesii'
C. obtusa 'Pygmaea Aurescens'
C. obtusa 'Sanderi'
C. obtusa 'Tetragana Aurea'
C. pisifera 'Baulevard'
C. pisifera 'Filifera Aurea'

C. pisifera 'Plumasa Aurea'
C. pisifera 'Snaw'
C. pisifera 'Squarrasa'
C. thyaides 'Heatherbun'
Cryptameria japonica 'Sekkan Sugi'
Cunninghamia lanceolata 'Glaucua'
Cupressus glabra 'Blue Ice'
x Cupressocyparis leylandii 'Silver Dust'
Daphne x burkwaadii 'Caral Mackie'
Erica carnea cultivars
Juniperus chinensis, *communis*,
depeana, *horizontalis*,
scapularum (many good color
 forms)
Leucothoe fontanesiana 'Girard's
 Rainbow'
Ligustrum japonicum 'Variegatum'
Liriodendron muscari 'Variegata'
Picea glauca 'Sander's Blue'
P. orientalis 'Skylands'
P. pungens 'Haapsii'
P. pungens 'Maerheimii'
Pinus densiflora 'Oculus-draconis'
P. muga 'Aurea'
P. muga 'Aurea Fastigiata'
P. parviflora 'Glaucua'
P. strobus 'Hillside Winter Gold'
P. thunbergiana 'Oculus-draconis'
P. virginiana 'Wate's Golden'
P. wallichiana 'Zebrina'
Platyclusus orientalis 'Berckmannii'
Thuja occidentalis 'Golden Glabe'
T. occidentalis 'George Peabody'
T. plicata 'Canadian Gold'
Thujopsis dalabrata 'Variegata'
Tsuga canadensis 'Golden Splendor'



Sculpture, statuary and other garden ornaments which are often eclipsed by summer's foliage can become focal points of the winter garden.
The greyhound above sports a bittersweet wreath.



Many homes and associated structures have large, blank surfaces — ideal candidates for imaginative horticultural treatment.
Here, espaliered red quince perks up a masonry wall in winter.



In winter when branches are bare, plants with interesting shapes, such as *Corylus avellana* 'Contorta', above, are transformed into living sculpture.

Scrutinize the colors and textures of your winter landscape. A striking combination such as the silver-blue foliage of juniper and red crabapples above provides visual excitement.

scene from looking flat and boring. Many plants become star performers as they poke through ice and snow to cast shadows, provide texture and movement and in some cases sounds — such as the rustling of grasses and bamboos. I've found that my sensitivity to the winter garden has changed as I now look forward to the subtle, sophisticated charms waiting to be discovered. The winter garden has taught me to look closer at the diversity of textures and forms and fine gradations of color.

As winter wears on, some of the herbaceous plants get crushed by ice and snow and some fade in color or become tattered. Throughout the winter on mild days, I go out and remove plants which no longer look attractive. This means that there is a constant change of scene. But it

always amazes me how long many plants remain handsome. In some instances, such as the ornamental grasses, I sacrifice the attractive remains of the plant only to make way for early season bulbs. When to finally cut them back is always a close call. I wait until the shoots of the first bulbs barely poke through the soil and then hesitantly remove the grasses. As much as I look forward to the early season bulbs and the return of spring, there is something wistful about removing the remains of last season's foliage — like finishing a good book.

Color and Texture

Scrutinize the colors and textures of your winter landscape to make sure that they provide visual excitement or a sense of

place or peacefulness. Do the evergreens afford a pleasing composition of different textures and shades of green? In the summer garden we talk about bold foliage advancing into view and finer textures receding. But we forget that they do this in wintertime as well. As for texture, there are the narrow, fine-textured needles of pines, the bolder, broader foliage of hollies and, in mild-winter areas, the large leaves of the evergreen magnolias.

Many plants have winter foliage in shades of yellow to gold, silver to gray, maroon to plum and beige to warm browns. These colors are often combined with interesting texture, providing the garden designer with many possibilities for the winter landscape. Again, we tend to look at individual plants when we consider color, but if the garden scene is to be successful the colors need to be blended into one harmonious whole.

I happen to admire color in winter twigs. Many books emphasize those plants which are especially dramatic, such as the red-stemmed dogwoods, the Stewartias with their exfoliating bark and the white-stemmed brambles. These are all beautiful and have their place in the winter garden — if they are used as elements of the larger composition and don't just draw attention to themselves. Even the more commonly grown garden plants have color, although it is subtler and requires a more trained eye to discern. Some of the plants actually change color over time due to exposure to sunlight or the effects of temperature. The best stem color is generally in full sun. Some plants such as the willows exhibit best color in the dead of winter but anticipate the return of spring by brightening and intensifying in color as the days lengthen and temperatures rise.

Garden Ornaments

Sculpture, statuary, sundials and other garden ornaments which often recede into summer's foliage can become focal points of the garden in winter. Birdbaths and shallow pools where birds drink and splash literally bring the winter garden to life.

Sculpture is often designed to be a center of attraction in both the summer and winter garden. However, an intriguing alternative is to have a piece of sculpture which is largely hidden in the summer become revealed as a focal point in winter. Large herbaceous plants such as *Miscanthus*, *Boltonia* or *Veronicastrum* could serve as the seasonal mask.

Other potential forms of sculpture are the structures and wrappings we use to protect plants from winter wind and cold. In general, we give these little thought, employing the most functional, and often unattractive, materials. However, in Japan, great attention is paid to making these protective structures beautiful. Often they're presented as important design elements in themselves.

Living Sculpture

Living sculpture is still another possibility. An old plant with an interesting shape can be transformed into a focus of the winter garden. I remember a beautiful modern house in Minnesota with many windows looking out on a lake. One window looked out onto a narrow exterior corridor through a French lilac which had been strategically placed for structural effect and to frame a view. The lilac had been thinned and opened up to afford views through the plant to the water, making the water view even more dramatic.

Plants with interesting natural forms can also be used for sculptural effect — weeping plants, plants with twisted

branching habits and strong fastigate shapes. In winter when the branches are bare, the structure of these plants can be much more fully appreciated. You might want to select a few strongly sculptural plants for key locations.

Weeping beech (*Fagus sylvatica* 'Pendula') with its strongly arching branches becomes especially beautiful in winter. When branches are covered with a thin coating of ice, sun and wind make the plant seem to sparkle and dance. While such a moment can be fleeting, when it happens the plant is transformed into a gigantic crystal chandelier. Harry Lauder's walking-stick (*Corylus avellana* 'Contorta') is largely unremarkable in summer when foliage masks the twisted branches. As the autumn winds rip away the final leaves the bones of the plant become a distinctive sculptural piece. I remember an unusual hedge of this plant. Underlit with night-lighting, it became a fence of sculptural twigs casting fantastic shadows.

Plants of distinctive form are most effective when placed along a walkway, driveway or other well traveled route in wintertime or when viewed from a favorite window.

Nightlighting

Among the negative aspects of winter are the long nights with the dark pressing against the glass and the wind rattling the windowpanes. Hence, nightlighting is one of the most useful devices for the winter garden. Adding just one or two lights can extend the view outward to a tree, wall, fence or piece of sculpture. Lights can lengthen the viewing time, accent a plant or plants or silhouette plant structure.

Gardeners typically do not appreciate the possibilities of strategically placed lights. Most people rely on spotlights mounted on a wall or near the roofline to

flood the lawn and garden with light. But garden lighting should be subtle and you should never be able to see the source of light. The desired effect is gentle highlighting, not blinding brightness.

It's easy to experiment with lighting yourself. Inexpensive plastic holders for spotlights intended for outdoor use are available at garden centers. Fit the holders with spotlights and spend an evening experimenting in your garden. Have a number of outdoor extension cords on hand, an adaptor plug which will enable you to plug in a number of fixtures at one source and a flashlight to assist you as you move about in the dark rearranging fixtures.

Experiment by shining the light up through shrubs, backlighting the stems or trunks of trees or casting light across a fence or wall. The light can be in front of the plant, behind it at ground level or high up in the plant itself. The light can aim upward or downward. I often use small nails to temporarily hold the light fixture in the tree. As you light a plant, look at it from many angles but especially from the point which will be the primary view. The experimenting can occur over a period of time so that you can carefully evaluate the effect.

There are many kinds of lighting fixtures and bulbs; a professional lighting consultant can advise you about the options. Once you've found a lighting effect that's to your liking, you can have an electrician wire it permanently into place.

One of the nicest things about a winter-time garden is that there are no weeds to worry about, insects are few and far between and there is little in the way of staking, deadheading and other chores. The winter garden is a relaxed and tranquil — and with a bit of imagination, visually and spatially exciting — place.

TREES AND SHRUBS FOR WINTER INTEREST

BY TIM BOLAND

*There is no thing in nature finer and
stronger than the bark of a tree;
it is a thing in place, adapted to its
ends, perfect in its conformation,
beautiful in its color and its form and
the sweep of its contour; and every
bark is peculiar to its species.*

Liberty Hyde Bailey
The Holy Earth, 1915

Charles Scribners & Sons, New York

CHRISTINE M. DOUGLAS



Gardeners often seek out plants that signal the beginning or the end of a season. For example, many covet the cheerfulness of ornamental cherries blooming in the wake of the first warm days of spring.

TIM BOLAND is the Nursery Manager/Plant Propagator at Michigan State University, which includes the Beal Botanic Garden. He graduated from MSU with a B.S. in Landscape Horticulture, worked as an intern at the Scott Arboretum and was a fellow at Wisley, the garden of the Royal Horticultural Society of England.



Woody plants with exceptional form or bark add drama to the winter landscape. Above is the native Canadian hemlock, *Tsuga canadensis*.

or a shade tree that becomes a blaze of crimson in fall, marking the end of another growing year. However, there are a number of trees and shrubs that save their best performance for winter.

Too many gardeners rely on evergreens to provide color in the winter landscape. While I don't dismiss their use, I maintain that there are also many deciduous plants that add interest to the winter garden. By selecting plants with exceptional form, structure or bark homeowners can add color and beauty to the winter landscape and increase the garden's year-round appeal. Whether a large specimen

ROBERT KOURIK



Acer griseum, paperbark maple.

tree or smaller trees and shrubs, the possibilities are endless. I've compiled the following list of trees and shrubs with fellow midwestern gardeners foremost in mind, but many are also suitable for gardens throughout the East.

Some of the most majestic native trees for winter drama are the North American oaks. In general, they become large trees with strong, stout branches. The white oak, *Quercus alba*, the largest and longest living species oak in North America, develops into a magnificent tree with long, thick, horizontal branches coming from a

sturdy trunk to form a broad rounded crown. It strikes an imposing silhouette against a bright winter sky. The bur oak, *Quercus macrocarpa*, a heavy branched tree with a large gray trunk and ascending branches, assumes a rugged character in the winter garden. The roughened twigs have broad corky wings which add additional interest. The chestnut oak, *Quercus muehlenbergii*, another oak with an exceptional form, develops into a medium size tree with attractive, brownish-white, flaky bark. Its sweet acorns are treasured by humans and wildlife alike.

RECOMMENDED TREES AND SHRUBS

SPECIES COMMON NAME SIZE

<i>Acer buergerianum</i>	Trident Maple	M
<i>A. capillipes</i>.....	.....	S
<i>A. griseum</i>	Paperbark maple	M
<i>A. pensylvanicum</i>	Striped bark maple	M
<i>A. triflorum</i>	Three flower maple	M
<i>A. truncatum</i>	Shantung maple	M
<i>Aesculus octandra</i>	Yellow buckeye.....	L
(syn. <i>A. flava</i>)		
<i>Amelanchier x grandiflora</i>		M
<i>A. arborea</i>	Downy serviceberry	M
<i>A. canadensis</i>	Shadblow	S
<i>Betula alleghaniensis</i>	Alleghany birch	L
<i>B. lenta</i>	Sweet birch	M
<i>B. lutea</i>	Yellow birch.....	L
<i>B. nigra</i>	River birch.....	L
<i>B. nigra</i> 'Heritage'	Heritage river birch	L
<i>B. papyrifera</i>	Paper bark birch	L
<i>B. platyphylla</i> var.		
<i>japonica</i> 'Whitespire'	Whitespire birch	M
<i>Carpinus betulus</i>	European hornbeam.....	M

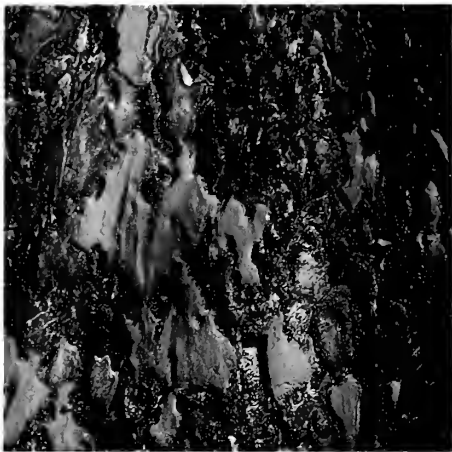
A member of the oak family which is often overlooked is the American beech. Commonly found in native forests, it is less common in the cultivated landscape. Like some of the larger oaks, the American beech demands a big open space. Given ample room it will become a massive, yet graceful, tree with smooth gray bark and wide spreading branches. (Unfortunately for this native giant, the smooth gray bark provides an enticing surface for tree carvers and graffiti artists.)

While these large trees are worth seek-

ing out and planting, they require large spaces and many years to develop. For many gardens a small or medium size tree is a more suitable choice. The river birch, *Betula nigra*, found along streams and in wet areas in the wild, has a flaky whitish-brown to cinnamon-brown exfoliating bark. At maturity it will reach 30 to 50 feet with a rounded crown. Because the degree of exfoliating bark varies from tree to tree, it is best to purchase trees that already exhibit showy bark. An exceptional cultivar, 'Heritage', has handsome peeling bark and dark green foliage. An attractive land-

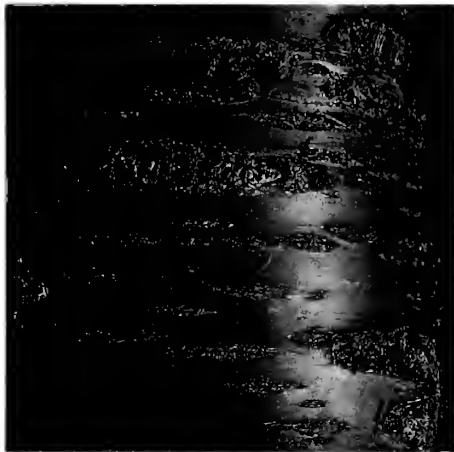
SPECIES	COMMON NAME	SIZE
<i>C. caroliniana</i>	American hornbeam	M
<i>C. japonica</i>	Japanese hornbeam	M
<i>Carya ovata</i>	Shagbark hickory	L
<i>Celtis occidentalis</i>	Hackberry	L
<i>Chionanthus retusus</i>	Chinese fringetree	M
<i>C. virginicus</i>	Fringe tree	M
<i>Cladrastis lutea</i>	Yellowwood	L
<i>Cornus alba</i> 'Sibirica'	Tatarian dogwood	S
<i>C. alternifolia</i>	Pagoda dogwood	S
<i>C. controversa</i>	Giant dogwood	L
<i>C. kousa</i>	Kousa dogwood	M
<i>C. mas</i>	Cornelian cherry	M
<i>C. officinalis</i>	Japanese cornel	M
<i>C. racemosa</i>	Gray dogwood	S
<i>C. sanguinea</i> 'Viridissima'	Blood twig dogwood	S
<i>C. sericea</i> 'Cardinal'	Red osier dogwood	S
<i>C. sericea</i> 'Flaviramea' .....	.....	S
<i>C. sericea</i> 'Isanti' .....	.....	S
<i>C. sericea</i> 'Sibirica' .....	.....	S
<i>C. sericea</i> 'Silver and Gold' .....	.....	S
<i>Corylus colurna</i>	Turkish filbert	L
<i>Cotinus obovatus</i>	American smoke tree	M
<i>Diospyros virginiana</i>	Persimmon	L
<i>Evodia danielii</i>	Korean evodia	L

(Continued on page 22)



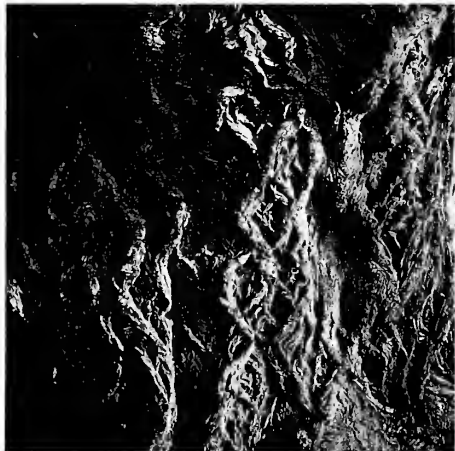
LAURA COIT

Ulmus parvifolia,
Chinese elm.



ELVIN McDONALD

Prunus serrulata,
Japanese flowering cherry.



ELVIN McDONALD

Salix x sepulcralis,
weeping willow



CHRISTINE M. DOUGLAS

Betula maximowicziana,
monarch birch.

scape feature throughout the growing season, exfoliating or peeling bark is most prominent in the winter landscape. One of the most sought after trees for its bark is the paperbark maple, *Acer griseum*. A small to medium size tree, it has beautiful reddish-brown bark that begins to curl and peel at an early age. In full sun with a moist, well-drained soil, this maple develops into an unrivaled specimen tree. A

Michigan garden gave me my most vivid impression of this tree: a beautiful thirty-year-old specimen accented by a soft green carpet of the allegheny spurge, *Pachysandra procumbens*, at its base. The paperbark maple is difficult to propagate and therefore usually expensive.

Another choice medium size tree, with mottled bark, is the lacebark elm, *Ulmus parvifolia*. Lacebark is a descriptive term



Betula nigra,
river birch.



Cornus alba 'Sibirica',
red-barked dogwood.



Rubus biflorus,
Himalayan bramble.



Cornus sericea 'Flaviramea',
golden-twig dogwood.

for the beautiful contrasts of orange and brown flakes that appear on its trunk and branches. This elm performs well in tough urban situations and makes an exceptional shade tree in the summer months. It is also resistant to the Dutch elm disease that devastated our most graceful native, the American elm.

Some of our beautiful native understory trees also make fine selections for the win-

ter garden. The striped bark maple, *Acer pensylvanicum*, is a small tree with a jade-green trunk marked with soft white striations. Plant this species in a woodland situation in filtered light; like many woodland plants, it thrives in a spot that closely mimics its native habitat. It does not perform well in full sun as a specimen in a lawn. A closely related species, *Acer capillipes*, is native to Japan and has a similarly

striped bark. It too should be planted in a protected site, not in full sun.

The shadblow, *Amelanchier canadensis*, which blooms in early spring, is also a graceful addition to the winter garden. This multistemmed shrub or small tree spreads by suckering from its base, forming a mass of smooth gray branches subtly marked with dark gray and white striations. A native woodland plant, it thrives in full sun. *Amelanchier arborea*, the downy serviceberry, is similar in appearance but at maturity is more treelike and has a far greater spread.

Shrubs like yews and junipers which are planted to provide evergreen color in the winter landscape are complemented by shrubs with colorful stems that offer a striking contrast. There are several *Cornus* selections which are noteworthy for their brightly colored stems including 'Viridissima', 'Sibirica' and 'Isanti' with blood red twigs, and 'Flaviramea' with greenish-yellow stems. All of these combine well with other plants in a mixed border. Because new or one-year-old stems are the most colorful, it is important to prune out the older wood that is losing

SPECIESCOMMON NAMESIZE

<i>E. hupehensis</i>	Hupeh evodia	L
<i>Fagus grandifolia</i>	American beech	L
<i>F. sylvatica</i>	European beech	L
<i>Gymnocladus dioica</i>	Kentucky coffee tree	L
<i>Halesia carolina</i>	Carolina silverbell	L
<i>H. monticola</i>	Mountain silverbell	L
<i>Hovenia dulcis</i>	Japanese raisin tree	M
<i>Hydrangea anomala</i> subsp.	Clinging hydrangea	vine
<i>petiolaris</i>		
<i>H. quercifolia</i>	Oakleaf hydrangea	S
<i>Liquidambar styraciflua</i>	Sweetgum	L
<i>Maackia amurensis</i>	Amur maackia	L
<i>M. chinensis</i>	Chinese maackia	M
<i>Magnolia acuminata</i>	Cucumber tree	L
<i>Metasequoia glyptostroboides</i>	Dawn redwood	L
<i>Nyssa sylvatica</i>	Tupelo tree	L
<i>Ostrya virginiana</i>	American hop hornbeam	M
<i>Parrotia persica</i>	Persian ironwood	M
<i>Phellodendron amurense</i>	Corktree	L
<i>Prunus maackii</i>	Amur chokecherry	L
<i>P. sargentii</i>	Sargent cherry	M
<i>P. serrula</i>		M
<i>P. subhirtella</i> 'Pendula'	Weeping higan cherry	M

color. Pruning also encourages new growth. Two recent introductions include 'Cardinal', with cherry-red stems, and 'Silver and Gold', with yellow stems and elegant variegated foliage during the growing season.

A more subtle dogwood is *Cornus racemosa*, the gray dogwood. In the winter the bare stems, soft gray at the base and topped by the chestnut brown of the previous season's growth, make a beautiful display when the sun shines on them. Commonly found growing with deciduous hollies in wetland sites,

the gray dogwood also tolerates dry or poor soils.

These are just a few of the many plants that can add depth and continuity to your year-round garden. While many of these plants are readily available, some will be difficult to locate but worth pursuing. Take time to visit local botanic gardens, arboreta or natural areas during the winter months to study these and other possibilities. To insure that trees readily adapt to your backyard environment, purchase them from nurseries that produce them from seed collected in your area.

SPECIES	COMMON NAME	SIZE
<i>Quercus bicolor</i>	Swamp white oak	L
<i>Q. macrocarpa</i>	Bur oak	L
<i>Q. muehlenbergii</i>	Chestnut oak	L
<i>Rubus biflorus</i>		S
<i>R. cockburnianus</i>		S
<i>Salix</i> 'Golden Curls'		S
<i>S.</i> 'Scarlet Curls'		S
<i>S. alba</i> 'Britzensis'		S
<i>S. alba</i> 'Vitellina'		S
<i>S. chaenomeloides</i>		S
<i>S. irrorata</i>		S
<i>S. melanostachys</i>	Black pussy willow	S
<i>Sassafras albidum</i>	Common sassafras	M
<i>Sorbus alnifolia</i>	Korean mountain ash.....	L
<i>Stewartia pseudocamellia</i>	Japanese stewartia	M
<i>Syringa pekinensis</i>	Peking lilac	M
<i>S. reticulata</i>	Japanese tree lilac	M
<i>Taxodium distichum</i>	Bald cypress	L
<i>Tilia petiolaris</i>	Pendent silver linden	L
<i>T. tomentosa</i>	Silver linden	L
<i>Ulmus parvifolia</i>	Lacebark zelkova.....	L
<i>Zelkova serrata</i>	Japanese zelkova	L

DECIDUOUS HOLLIES

BY ANDREW BUNTING

Deciduous hollies are stars in the winter garden. During the winter months they provide orange and red berries.* These waxy fruits cover the naked branches and persist for weeks.

Deciduous hollies are members of the genus *Ilex*. They are related to the more common evergreen hollies, like the American holly, *Ilex opaca*, and the English holly, *Ilex aquifolium*, but their leaves are thinner, spineless and deciduous. A number of species are valued as ornamentals, including *I. verticillata*, *I. serrata* and *I. decidua*.

Ilex verticillata, also called winterberry, and black alder or Michigan holly and its

* The fruit of deciduous hollies is technically a berrylike rounded drupe; in this article we use the common term berry.

ANDREW BUNTING is Curator of Plants at Chanticleer, a 32-acre private garden in Wayne, Pennsylvania which will soon open to the public. He previously worked at the Scott Arboretum and at Tintinhull House in England.

hybrids, from crosses of *I. verticillata* with *I. serrata*, are some of the most attractive deciduous hollies. The hybrids combine the large orange to red fruits of *I. verticillata* with the smaller, darker but more abundant fruits of *I. serrata*. What results are outstanding selections that fruit heavily. These hollies adapt well to a wide range of growing conditions. In the wild, *I. verticillata* grows in low woodlands and along river bottoms from Nova Scotia to Wisconsin and south to Florida. At the Scott Arboretum in Swarthmore, Pennsylvania, they thrive and produce many fruits under hot, dry conditions. Deciduous hollies don't suffer from any serious pest or disease problems. Cold hardiness is another virtue: While most hollies are hardy only to USDA zone 5 (-10 to 20 degrees F), many of the deciduous hollies are hardy to zone 3 (-30 to -40 degrees F).

For optimal growth, plant deciduous hollies in full sun to partial shade, in acid soil that is high in organic matter. A pH of 4.5 to 6 is best as they may develop chlorotic leaves if the pH is too high.



Ilex verticillata 'Shaver'. While most hollies are hardy only to USDA zone 5, many deciduous hollies are hardy to zone 3. The waxy fruits persist for weeks.

The only maintenance these hollies require is selective thinning of branches. Deciduous hollies expand by stoloniferous underground stems and as they mature they often form thickets. Pruning to thin out the older branches will encourage young vigorous growth.

Once the proper growing environment has been established there are a number of effective ways to display deciduous hollies. A dramatic combination that may appeal to native plant enthusiasts is *Ilex verticillata* with its bright red berries and *Hamamelis virginiana* with its yellow flowers, planted against a background of dark evergreen arborvitae, *Thuja occidentalis*. Equally striking is the effect of intertwining an espalier against a stone wall, of *I. x 'Sparkleberry'*, (a cross of *I. verticillata* and *I. serrata*) with its brilliant dark red berries, and *Hamamelis mollis* 'Pallida', with sulphur-yellow flowers. For beautiful combinations of color in fall, use deciduous hollies in combination with other ornamentals that exhibit showy fruits like the sapphire berry, *Symplocos paniculata*, beautyberry, *Callicarpa dichotoma*, *C. japonica*, or *C. bodinieri* 'Profusion' and the purple chokeberry, *Aronia prunifolia*.

Deciduous hollies planted in front of an evergreen background brighten up even the darkest corner of the winter garden. Good background plants include the dark green *Thuja*, *Chamaecyparis*, *Ilex glabra* and golden *Chamaecyparis obtusa* 'Crippsii', or for a blue-green background try an *Abies* or *Picea* sp. Using deciduous hollies for an informal hedge is an effective alternative to the ubiquitous burning bush, *Euonymus alatus*. Dwarf cultivars of these hollies such as *I. verticillata* 'Red Sprite' and *I. x 'Hopewell Myte'* make

good foundation plantings. Masses of deciduous hollies in fruit become even brighter when covered with a fresh layer of snow.

My favorite deciduous hollies are the dark red, heavy fruiting selections like *I. x 'Sparkleberry'*. Its branches are covered with glossy dark red berries that contrast with its dark green foliage as the berries turn from green to red in September. Persisting longer than most deciduous hollies, their colorful fruits provide an effective display well into March. *Ilex verticillata* 'Winter Red' is another choice cultivar with dark red fruits. While many selections of *I. verticillata* and *I. serrata x verticillata* may reach up to 12 feet, 'Winter Red' matures at six to eight feet, making it well suited for smaller gardens. Unlike other cultivars that must reach a certain age before they produce an effective fruit display, 'Winter Red' begins fruiting as a three year old.

Another deciduous holly that is well suited to the small garden is 'Red Sprite' growing to only three feet. At the Scott Arboretum a group of 'Red Sprite' is planted near the base of a *Betula pendula*. The red fruit against the white bark makes for a colorful winter scene. Due to be released in the 1990s is the smallest holly of this type, 'Hopewell Myte', a dwarf descendant of 'Sparkleberry'. It produces an abundance of red fruit and after ten years is only two feet high.

Also worthy of consideration, with long lasting, bright red fruits, are *I. x 'Harvest Red'* and 'Autumn Glow'. 'Tiasquam' has large red fruits that are set off by its rich dark green foliage. A good upright form, 'Cacapon' arches under the weight of its fruits.

If you don't like the true red-fruited deciduous hollies there are more subtle orange-red fruited cultivars. Although production may be sparse, *I. verticillata* 'Earlibright's' fruits are large, one-half inch in diameter. 'Bright Horizon' has a bushy habit and produces an abundance of berries and dark green foliage. 'Fairfax', another heavy fruiter, has purple fall foliage. *Ilex verticillata* 'Sunset' has a spreading form and 'Afterglow' is a small holly with glossy leaves, reaching six feet in height. A cultivar with fruits that are a true orange is 'Aurantiaca', but they do not persist and as they age they fade to a yellow-orange.

Yellow-fruited cultivars are rare in the nursery trade but a few are available, including *Ilex verticillata* 'Winter Gold'. A branch sport of 'Winter Red', it, too, is a good choice for the small garden. A yellow-fruited form of the native *Ilex verticillata*, var. *chrysocarpa*, discovered in the wilds of Massachusetts, is a good yellow but does not produce the abundance of fruit that the red forms do.

A deciduous holly with a treelike habit, *Ilex decidua*, the possumhaw, exhibits a range of colorful berries that vary from yellow to red. At maturity it will reach 15 feet, with an umbrellalike habit. Like other deciduous hollies, it will grow in full sun or partial shade. Unlike *I. verticillata* which develops chlorosis if the soil pH is too high, *I. decidua* will tolerate alkaline soils. 'Warren's Red' is considered to be the best selection of the possumhaw. A large upright plant, its dark green foliage is replaced in fall by an abundance of bright red fruits. Other outstanding cultivars for red fruits include: 'Reed', 'Sentry', 'Red Escort', 'Pocahontas' and 'Red Cascade' which is a large plant with silvery, wavy branches.

Both 'Council Fire' and 'Sundance' have orange-red berries and a compact habit, growing to seven feet high by six feet wide after nine years. For showy yellow fruits try 'Byers Golden', with berries that persist until February. 'Gold Finch' is also available.

The Japanese equivalent to the native American deciduous hollies is *Ilex serrata*, also called the fine-tooth holly or Japanese winterberry. Like other deciduous hollies it too thrives in both wet and dry sites. In the wilds of Japan and China it grows in wet areas. This holly has many positive attributes. An abundant fruiter, its one-quarter-inch berries are the darkest red (blood red) of any of the deciduous hollies, making it a valued species for holly breeding programs. Under cultivation it rarely exceeds eight feet in height, providing another choice plant for the small garden. *I. decidua* 'Leucocarpa', often sold as a white fruiting form although the fruits are more of a pale yellow, is worth seeking out. A selection with tiny yellow fruits that cover its branches is 'Xanthocarpa'. An unusual dwarf selection with very small leaves and berries, a twisted, twiggy habit and new growth that is a rich purple is 'Koshobai'. The most suitable use for this holly is as a bonsai specimen.

There is also an assortment of native American hollies, not as well known, which include *I. collina*, considered by some to be a species of *Nemopanthes*. *I. collina* 'Mary Randolph' and 'Mary Staggers' are selections with red berries. Also a native, *Ilex longipes*, the Georgia longstalk holly, has red fruits borne on pendulous pedicels. 'Natchez Belle' is a select form of this species. The native *Ilex amelanchier* has small velvety red fruits.

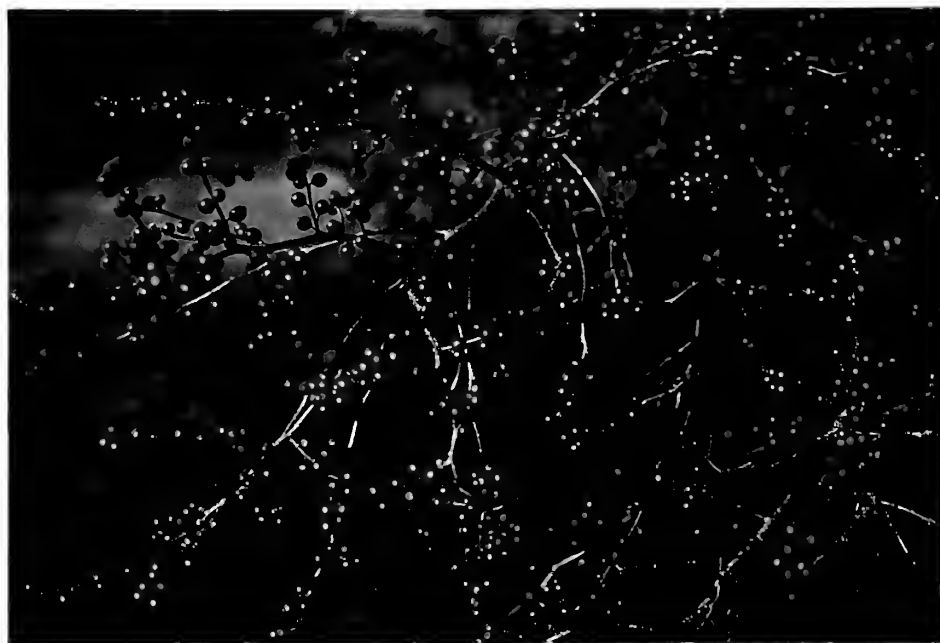
All hollies are dioecious, which means

that plants bear either male or female flowers. Only female plants will produce fruit, but for fruiting to occur there must be a male in the vicinity to pollinate the female flowers. (One male is needed for every 10 to 20 females. A male plant can be planted in the back of a mass planting or in a separate part of the garden; within 50 feet of the females is best.) Bees are the chief pollinator for hollies. For the hybrids that are the result of crosses of *I. serrata* and *I. verticillata*, which include 'Sparkleberry', 'Autumn Glow', 'Bonfire' and 'Harvest Red', good pollinators are 'Apollo' or 'Raritan Chief'. For selections of *I. decidua* and *I. serrata*, the male species of either type can be used for a pollinator. For *I. verticillata* and its cultivars, two outstanding male cultivars are available. Both *I. verticillata* 'Quansoo'

and *I. verticillata* 'Jackson' produce large amounts of pollen. 'Jackson' has the added benefit of purple foliage in the fall, making it the more desirable choice. Males of the American holly, *Ilex opaca*, can also serve as pollinators for cultivars of *Ilex verticillata*.

The easiest method of propagation is from cuttings. Softwood cuttings, four to five inches long, taken from June to July and treated with 7,500 ppm IBA quick dip or talc (trade brands include Hormodin #3 or Rootone), placed in a peat/perlite mix with mist will root in six to eight weeks. Starting from seed is impractical because germination takes up to a year.

The ripe and colorful berries of deciduous hollies mark the end of the growing season and enable gardeners to enjoy a winter landscape ablaze with color.



SCOTT ARBORETUM

Above: *Ilex* 'Harvest Red'. Plant deciduous hollies in full sun to partial shade in acid soil that is rich in organic matter.



Miscanthus 'Zebrinus' strikes a sculptural pose in the winter garden.

ORNAMENTAL GRASSES FOR THE WINTER LANDSCAPE

BY RICK DARKE

Many ornamental grasses are at their best in winter. Intricately detailed yet surprisingly sturdy, the dramatic flower heads often become even more attractive after being dried and brightened

RICK DARKE'S work as *Longwood Gardens'* curator of plants has taken him around the world in search of new plants for American gardens. His special interests include native American plants and ornamental grasses, both native and exotic. His home garden in Pennsylvania features wildflowers and grasses.

by the autumn sun. The leaves of some are evergreen, adding welcome greens or subtle blues to the winter landscape. Others dry to winter hues of chestnut, almond, russet and fawn. These light colors can be dramatically set off by a backdrop of dark green conifers, or they can be used to provide contrast for colorful bark such as that of paperbark maple, *Acer griseum*, or *Prunus serrula*, or bright berries such as the red winterberry holly, *Ilex verticillata*. As in summer, the winter winds play with the grasses, bringing movement and sound to this potentially still, silent season. The

winter beauty of the grasses is accentuated by a light coating of snow, and an ice storm can turn seedheads into glistening jewels.

Maintenance is a relatively simple matter of cutting back old growth once a year, plus occasionally lifting and dividing clumps. Most true grasses (members of the grass family, Gramineae) prefer sunny spots in the garden, although they are otherwise adapted to a wide range of soil and moisture conditions, and are relatively disease-free. The following grasses are among the best for the winter garden. Chosen for their length of interest and ease of maintenance, all are reliably cold-hardy through zone 5, unless otherwise noted.

The genus *Andropogon* includes a number of North American native species well suited to naturalistic winter gardens. All are sturdy enough to withstand repeated snows, and their colors generally last through winter into spring. Broomsedge, *Andropogon virginicus*, is perhaps best known for the rich orange color of its winter foliage. The flowers are small but numerous, occurring in clusters along the upright stems, and glow in the sun. Best used in masses or sweeps in dry sun, as it occurs naturally, broomsedge is hardy into zone 3. The winter color of bushy beardgrass, *Andropogon glomeratus*, is more salmon, and the flowers are clustered near the top of the stem, surrounded by broad leaf sheaths. Slightly shorter but more substantial than broomsedge, this species is effective in masses or as a specimen. Naturally adapted to wet sites, it is easily grown in drier garden soils, and is hardy into zone 4. Elliot's broomsedge, *Andropogon elliotii*, is similar, but the leaf sheaths surrounding the flowers are fewer, broader and deep orange in color. The foliage of *Andropogon ternarius* turns purple-red in fall, and remains colorful long into winter. The

upright flowering stems are among the showiest of the beardgrasses. Big bluestem, *Andropogon gerardii*, generally deteriorates by December and is not effective in the winter garden.

Karl Foerster's feather-reed grass, *Calamagrostis x acutiflora* 'Karl Foerster', grows five feet tall and is treasured for its narrow, upright flower plumes, which are effective from June through March. It performs well in full sun or light shade, and is equally effective as a single specimen or in a huge sweep. Fine textured but sturdy enough to withstand moderate snows, it is hardy through zone 4. A sterile hybrid, it is easily propagated by division in spring or fall.

Korean feather-reed grass, *Calamagrostis arundinacea* var. *brachytricha*, is quite different from the preceding. Preferring light shade, this species is more lax in habit, producing broader terminal flower clusters that remain into January.

Wild-oat, *Chasmanthium latifolium*, is one of the finest grasses for winter interest. Growing three to four feet tall, it is adapted to full sun or as much as half shade, and is cold-hardy through zone 4. The attractive oatlike flower clusters are nearly one inch long. Suspended at the ends of gracefully arching branches, they are attractive from early July until the following spring, and make excellent cut flowers. Wild-oat is effective as a specimen or in mass, and is sturdy enough to withstand heavy snows and ice. It has a tendency to self sow; however, it is easily managed.

It is easy to understand why true pampas grass *Cortaderia selloana*, has often been overused from zone 8, south, where it is reliably cold-hardy. Often exceeding ten feet in height, pampas grass produces huge feathery plumes above the basal foliage, which is evergreen in warmer zones. The plumes last through the winter and are superb in dried arrangements. Variegated

cultivars such as 'Goldband', which has yellow-striped leaves, are effective year-round in southernmost zones. Smaller in stature and less a Victorian icon, the cultivar 'Pumila' is more suited to smaller, modern gardens and is often hardy into zone 7.

No other grass can rival the lofty winter display of ravenna grass, *Erianthus ravennae*, a native of southern Europe. Giant reed, *Arundo donax*, is equal in height but generally deteriorates by November, offering little winter interest. Ravenna grass is often used in place of pampas grass in cold climates, since it is reliably hardy through zone 6 and into zone 5. In late summer, the large flower plumes open on straight stems, towering nearly 15 feet above the basal foliage. Ravenna grass always remains attractive through January, and in mild winters it is still effective into March. The genus *Erianthus* also includes a number of little-known North American natives that hold great promise for the winter garden. They are generally much smaller than ravenna grass, ranging from six to nine feet in height, and are more in scale with modest residential gardens. Bent-awn plume grass, *Erianthus contortus*, is bolt-upright, to six feet tall. Its rich orange-red fall foliage color persists through most of winter, and the sturdy flower stems will still be standing in late March. It prefers full sun. Silver plume grass, *Erianthus alopecuroides*, is similar but lacks the reddish winter color. It is adapted to shady sites.

Most ornamental fescues, *Festuca* spp., are evergreen or semievergreen even in colder climates, and can add significant interest to the winter garden. Most commonly available are various blue or blue-green leaved cultivars of *Festuca ovina* and *Festuca cinerea*, which are usually no more than eight inches tall. They are hardy in zone 4, and will remain attractive nearly

year-round if provided excellent drainage. Growing one foot in height but similar in blue-foliage effect is *Festuca amethystina* 'Superba'. Atlas fescue, *Festuca mairei*, makes an elegant two-foot-tall mound of gray-green foliage. For milder climates there are excellent blue-leaved forms of California fescue, *Festuca californica*.

Blue oat grass, *Helictotrichon sempervirens*, is among the best of the blue-leaved grasses for winter. Cold hardy to zone 5 and fully evergreen in zones 8 south, it produces a 16-inch tuft of fine-textured foliage. Good drainage is a must.

As a group, the various cultivars of *Miscanthus sinensis*, are hard to beat for winter interest. Most prefer full sun; however, they tolerate a wide range of soil and moisture conditions. Although most of these large grasses go fully dormant, their bold foliage and flower heads are sturdy and persistent, having more presence in the winter garden than any deciduous shrub. The flower heads may be cut through the winter for use in dried arrangements. Winter foliage color is usually a pleasing light beige. If left standing, miscanthus will begin to shed leaves by early winter, necessitating a certain amount of clean-up if the desire is to keep the garden "litter-free." The winter beauty of these plants more than justifies this minimal amount of care. After all, is it reasonable to expect the winter garden to be a "no-maintenance" garden?

Not surprisingly, miscanthus cultivars that flower later in the season remain attractive longer into winter. Many are still in good shape in late March, when they should be cut back before new growth begins. 'Gracillimus' and 'Sarabande' both have fine-textured green summer foliage, and stand up well through winter storms. 'Morning Light' is similarly fine-textured and durable, with white-striped summer



The bold foliage and flower heads of the various *Miscanthus* cultivars have more presence in the winter garden than deciduous shrubs.

Above: *Miscanthus sinensis* 'Gracillimus'.

foliage. Of all the broad-leaved white-variegated types, the recent introduction 'Cosmopolitan' is sturdiest and longest-lasting in the winter garden, far surpassing the old-fashioned 'Variegatus'. As for the gold-banded cultivars, 'Strictus' is sturdier in winter than 'Zebrinus'. The more diminutive cultivars 'Yaku Jima' and 'Adagio' hold up well. 'Purpurascens' is best known for its orange-red fall color, and the dormant foliage retains an attractive reddish cast into late winter.

Growing four to five feet tall, our North American native switch grass, *Panicum virgatum*, remains attractive and upright throughout winter, even when there is considerable snowfall. Of the available culti-

vars, 'Heavy Metal', which is blue-leaved in summer, is the most strictly upright.

The flowers of hardy fountain grass, *Pennisetum alopecuroides*, are generally past peak by November, however the foliage, especially that of the low-growing cultivar 'Hameln', can make an effective groundcover through February.

Little bluestem, *Schizachyrium scoparium*, is finer textured but similar in most aspects to *Andropogon*, in which it was once included. Although best for naturalized groups or masses, its orange-red winter color can be very satisfying against a winter snow.

The genus *Sesleria* includes a number of evergreen or semievergreen species of



Miscanthus sinensis 'Gracillimus' holds up well through winter storms. In late March, it should be cut back before new growth begins.

merit in the winter garden. *Sesleria autumnalis* produces a tufted mound of light green foliage 16 inches tall, which retains its color through most of winter. It prefers light shade, and is suited to groundcover massing. The leaves of *Sesleria heufleriana* are blue-green, also to 16 inches tall. The curious dark brown to black flowers rise out of the foliage in early March, providing late winter interest.

Indian grass, *Sorghastrum nutans*, is another North American native with considerable winter interest. Upright in habit and five to seven feet tall, its foliage and flowerheads remain attractive into February. Of the blue-leaved prairie types, the cultivar 'Sioux Blue' is the sturdiest and

most upright though winter. Indian grass is hardy through zone 4.

Little known but readily available, Japanese themeda, *Themeda japonica*, offers unique sculptural interest in the winter garden. The stems radiate in a dramatic arc five feet tall, and although delicate in appearance, they usually stand up through January, sometimes into March.

Purple-top, *Tridens flavus*, is best known for the "purple top" it puts on local old-fields and meadows in late summer. This native clump former is spare and open, but its delicate flower panicles can be exquisite when covered by a winter frost or a thin mantle of ice. They remain standing through winter and into the following spring. *

HERBACEOUS PLANTS FOR THE WINTER GARDEN

BY JOANNA REED

Here in Pennsylvania, winter is a season to enjoy gazing through frosted windows from the warmth of a cozy room, or walking on crunchy leaves dusted with snow.

During my childhood winter was exciting only when white with snow, enough to cloak the gloomy barrenness, enough for sledding and snowballs. Snow always brings smiles to winter sports enthusiasts. But gardeners also smile as deep snow provides cover from drying winds and scorching sun.

With or without snow, winter took on new dimensions as I attended classes at the Arboretum of the Barnes Foundation in Merion, Pennsylvania. As I toured the Arboretum weekly, I became aware of patterns ranging from the light filigree of

deciduous branches to stark verticals of tree trunks and colors ranging from the ghostly grays to browns that are almost black. Bark was splotted, striped and exfoliating, diverse and interesting and there were greens of all conceivable shades. Shape, texture, sun and air movement, as well as size, determined how these greens appeared. Evergreens — trees and shrubs, needled and broadleaved, solid green or variegated — contrasted with and enhanced one another.

Deciduous plants added lightness. Fruits in clusters or single provided dashes of color. On the ground a tapestry of foliage, green, bronze, gray and mauve intermingled with dried furled leaves and stones, some bare, others covered with soft green mosses.

Those shivery winter walks at the Barnes Arboretum engendered great enthusiasm and made me more aware of the local vegetation. The farm fields and dividing hedgerows provided a pleasant rhythm. An occasional lone cedar, *Juniperus virginiana*, or black alder, *Ilex verticillata*, provided contrast and sparkle. The

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wooded acres were also influential in the planning and planting of my own garden, a process that has been going on for close to 50 years.

The trees that were under two feet tall when I planted them now provide vertical interest, serve as focal points and shelter spaces and buildings: *Cercidiphyllum japonicum*, magnolias, *Paulownia tomentosa*, *Styrax japonicus*, *Cornus florida*, *Cornus kousa*, *Cornus mas*, *Ilex opaca* and *Cryptomeria*. A mass planting of swamp maples, ash, *Amelanchier canadensis*, *Liquidambar styraciflua* and *Nyssa sylvatica* screens from view a highway, and merges into a softened right angle with the existing woods.

These trees, underplanted with shrubs, serve as backgrounds for herbaceous borders, and as dividers to create rooms. Trees and shrubs were selected to provide winter interest and color, as well as blooms and shade. Herbaceous plants unite them into distinct landscape masses and tie them to the earth.

First I planted the area between shrubs and under trees with bulbs. For ground-covers I planted vinca, pachysandra and ivy. The ivy proved too willing to climb all and everything, making it too vigorous and labor intensive for all but a few situations. To gain texture and height, over time I have added or replaced plants throughout the garden. Many of them are winter stars I use as edging or other features, as well as carpets.

Arum italicum appears in October. Tightly furled leaves poke through the shiny bronze mats of *Ajuga reptans* and whorls of sweet woodruff. It is odd to see a plant commence growth at such a late date. Its rich green arrow-shaped leaves overlaid with creamy white patterns are eight to 12 inches long and are fresh and sprightly until late spring. The blossoms,

pale yellow spathes which appear in spring, are the plain Jane cousins of better known tropical calla lily, *Zantedeschia*. The fruit (which my patch has yet to produce) is similar to jack-in-the-pulpit, spikes of orange-red berries in summer rather than fall. Fortunately, the tubers multiply and increase, as this arum is not a reliable fruit producer.

Another October lovely is *Cyclamen hederifolium*. Slender stemmed, fragile pink and white flowers appear suddenly before the foliage, which soon follows. Handsome variegated ivy-shaped leaves clothe the ground until late May when the plant goes dormant again until October. *C. hederifolium* is the hardiest cyclamen species and the easiest to grow. The stem carrying the seed capsule winds itself into a tight spring, hugs the ground until ripe, then releases and scatters the seeds some distance from the mother plant. Eventually a tuber forms that grows in size rather than dividing and multiplying like a bulb. This plant is happy among tree roots in dry shade. In my garden it has colonized under large old yews.

Helleborus foetidus, the stinking hellebore, has evergreen, narrowly lanceolate lustrous dark green foliage winter through summer. Large enough to be a featured specimen, vigorous enough to sheathe an area with interesting foliage and compliant enough to share its space with a floriferous perennial like *Begonia grandis*, it is a plant everyone should have. The flower buds form in late November, and in December open into clusters of bell-shaped chartreuse flowers. On the coldest single-digit days of winter they collapse to the ground but let the sun coax the temperature into the 20 to 30 degree F range and the hellebores are again fresh and crisp. Try a few under a February-bloom-



Ajuga 'Burgundy Glow' forms a handsome year-round carpet.

ELVIN McDONALD



ELVIN McDONALD

Cyclamen hederifolium, the hardiest and easiest cyclamen to grow, with a winter frosting.

ing *Hamamelis mollis* or plant them among early-blooming pale yellow primulas and *Viola labradorica*.

Helleborus niger, the Christmas rose, is the next species to bloom. The foliage is attractive all year. Large deep green, sparsely toothed, palmate leaves enhance the blooms. Borne singly on sturdy stems, they are usually white, at times suffused with pale pink. Bloom time varies with individual plants.

Next in the sequence is *Helleborus orientalis*, the lenten rose, as lush and dark a green most of the year as *H. niger*, although by February and bloom time, apt to be brown and burned. This burned



Santolina virens, gray-leaved *Artemisia ludoviciana*
and the bronze seed heads of *Sedum* 'Autumn Joy'
in the author's garden.

foliage can be clipped away. Buds emerge from the ground in great thick clusters. The flowers, two or three to a stem, reliably give a good show, ranging in color from creamy white to deep purple, including a spectrum of pinks, roses and mauves, mottled or freckled. I have seen them used stunningly to edge woodland and garden paths, enticing one to wander further into the woods. At Winterthur Garden in Delaware great drifts bloom with *Rhododendron mucronulatum*, *Corylopsis spicata* and an early rosy primula, a combination not soon forgotten. As the flowers of both of these species fade, all parts turn pale green and remain attractive until

early summer when the ripened seeds finally scatter.

Pansies, violas and johnny-jump-ups are always ready to seize a good day by blooming. *Viola hederacea* from Australia, however, must be keeping to its "down under" schedule. The white flowers appear in November and again in March. This stoloniferous plant makes a good ground cover over small bulbs. As a hanging basket indoors, it will bloom most of the winter.

Viola labradorica, from the frozen North, also spreads into glorious mats. The undersides of the small dark green heart-shaped leaves are a lovely rich purple. The

early spring flowers are small but showy. *Bergenia cordifolia* and related species, with bold leaves that lend substance to shrub and perennial borders, welcome one to a path or provide contrast in an area covered with smaller leaved plants like vinca or pachysandra. Just as welcoming is the fine foliage of *Iberis sempervirens*, or candytuft. The cultivar 'Snowflake' gives a good show of winter bloom.

Most thymes are evergreen. Ground-hugging mats or ten-inch sub-shrubs, they hold their tiny leaves until the March winds blow. Colors range from pale blue-gray to almost black-green. They are good in paving cracks, edging paths or in the front of a perennial border for winter definition.

Gray-blue dianthus with its many varieties; santolinas, both gray and green; hardy lavenders; rue and sages, especially *Salvia officinalis* 'Nana' can be used in the same fashion as thyme except in paving cracks. I have seen rue clipped into an interesting low hedge. No plant looks so dead as rue when it finally sheds its foliage. When these unlikely looking stems finally start budding out in late spring, cutting them back to the new growth will result in a stunning plant.

Another good gray, *Stachys byzantina*, surprisingly tolerant of shade as well as hot sun, moist or dry soil, retains its landscape value through the winter.

I am surprised that more people don't use *Polygonum affine* as an edging plant. Low four- to six-inch lanceolate leaves turn a rosy russet and persist all winter with seed heads poking upright like a regiment of tiny soldiers. Assuredly we are all cautious with polygonums, but this one is not as much a thug as some of its relatives, or as *Lamium galeobdolon* 'Variegatum' an unexpectedly evergreen plant with

attractive silver markings. *Low and creeping* the books and catalogs say; I'd say *galloping*.

Ajuga could also be called a thug but I would not be without it. Its foliage varies from a rich green with white, green with pink, green with purple and purple, pink and white. Although *Ajuga* is a spring bloomer, its foliage is handsome year-round.

The great rosettes of bright green, rough textured leaves of *Digitalis purpurea*, foxglove, lend stability as well as color. Like the hellebores, they resent it when the temperature drops to single digits but spring back dependably and continue giving pleasure. *Digitalis lutea*, with its smaller strap-like leaves and different general shape, is also a good plant for winter.

Throughout my garden are patches of young seedlings of *Silene armeria*, *Nigella damascena*, *Chrysanthemum parthenium* and *Digitalis purpurea*, which will be thinned and transplanted in spring. But for the winter they give flat washes of color on the ground.

Some seed pods I deliberately let stand until early spring. They add color and form, and bring birds to the garden — showiest is *Sedum* 'Autumn Joy', but *Baptisia australis*, *Physostegia*, *Rudbeckia*, *Perilla*, *Stachys officinalis*, *Iris sibirica* and some thymes all add interest through the winter months.

Working in the woods, pruning and picking up windfalls, brings me outdoors to enjoy the constant surprises and discoveries the garden offers. When the upright fronds of the Christmas fern lie close to the ground, making way for the new fiddleheads soon to come, and winter aconite and snowdrops pop out, I know spring is at hand, and December, January and February were not overly long after all.

HELLEBORES:

THE ARISTOCRATS OF WINTER-FLOWERING PLANTS

BY CHRISTOPHER WOODS

The winter garden is a showcase for texture and architecture in the landscape. The bare bones of shrubs and trees become bold and bright in the wintery sun. Flowers are rare, although precocious spring bulbs often force their way out of the cold earth to surprise us with their grace and delicacy.

We do not often think of herbaceous plants for winter — it is a time of quiescence; herbs will have their show when the world wakes. However, there are herbaceous perennials that are essential for the winter garden. Perhaps the finest are the hellebores, the Christmas rose, the Lenten rose and others.

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The genus *Helleborus* includes about 20 species native to western and southern Europe, including Corsica and the Balearic Islands, and Western Asia. They belong to the buttercup family (Ranunculaceae) and have saucer-shaped, nodding flowers in subtle hues of green, white, red, pink, or purple. It is the sepals that are the most prominent part of the flower; the petals are inconspicuous.

Hellebores can be divided into two groups, those with leafy stems with flowers carried at the tip of the stems and those without stems with both leaves and flowers produced from the base of the plant.

The leaves are leathery, pale to dark green, hand-shaped and deeply divided. Used in ancient times as a purgative, hellebores contain powerful poisons. The botanical name comes from the Greek, *elein*, to injure, and *bora*, food, referring



to the posionous leaves and roots.

Hellebores require fertile and moist but reasonably well drained soil in a partly shaded site, although they are tolerant of a considerable amount of sun. They are at their best in climates with mild winters where their evergreen leaves can be seen at their finest. In areas with cold winters, the leaves often become ragged and unattractive by spring. The damaged leaves can be removed when fresh new growth appears. Most species are tolerant of cold temperatures but they benefit from snow cover or a light mulch in cold climates.

Although they should be planted in a sheltered site and left undisturbed, propagation is not impossible. Carefully divide the fleshy roots in late spring immediately after the plants have flowered. It may take up to two to three years

ABOVE: *Helleborus argutifolius*, with elegant foliage and early-spring flowers, is a comely companion to snowdrops, crocuses and the Labrador violet.

OPPOSITE, TOP: *Helleborus orientalis*, called Lenten rose because it flowers in the 40-day period before Easter, tolerates dry soil and shade.

LOWER RIGHT: *Helleborous foetidus* bears unpleasant smelling but handsome pale green, maroon-edged, bell-shaped flowers in late winter.



for the newly divided plants to establish themselves.

Like many other members of the buttercup family, hellebores are difficult to grow from seed. The seeds require up to eight weeks of high temperatures (80 degrees F) and another eight weeks of low temperatures (32 degrees F) before the temperature is raised to 40 degrees F, when the seedlings should begin to germinate. After germination, raise the temperature to about 55 degrees F. Grow plants for two years before planting in the garden.

Fortunately, many species self-sow prolifically, and thus enable gardeners to increase their supply. Seedlings often appear around the base of mature plants. Remove carefully and transplant.

Often associated with other shade plants such as ferns and hostas, hellebores are also valuable low-growing plants under deciduous trees and shrubs, particularly when grown with spring-flowering bulbs or other early flowering perennials.

Despite the number of species and hybrids, few are commonly cultivated in North America. As awareness of the enormous variety and diversity of herbaceous perennials grows, the palette of hellebores should increase.

The following is a brief description of hellebores commonly available, along with a few that deserve to be grown more widely.

The two species most commonly cultivated are the Christmas rose, *Helleborus niger*, and the Lenten rose, *Helleborus orientalis*.

Helleborus niger is native to the mountainous regions of Europe and Asia minor. It is named the Christmas rose because it often flowers around Christmas. In much

of North America, however, it blooms in late winter and early spring. It is a low-growing plant, reaching about one foot in height, with a spread of 18 inches. The leaves and flowers are produced from the base of the plant. The sometimes spiny, dark green and leathery leaves are divided into seven to nine egg-shaped leaflets.

The saucer-shaped flowers, borne either singly or in pairs, are two to four inches wide and waxy white, with a central boss of yellow stamens. The flower stalk is often spotted red.

The Christmas rose is harder to grow than the Lenten rose. It needs moist but well drained neutral to alkaline soil in a partly shady site. It is sometimes susceptible to fungus diseases, particularly leaf-spot. The affected leaves should be removed and burned. Use fungicides only when damage to the plant is substantial. Hardy to -20 degrees F this hellebore is also tolerant of the hot and humid summers prevalent in much of North America.

A variable species, it produces forms with a variety of flower colors, sizes and bloom times. A few variants recognized by taxonomists are 'Grandiflorus', a strain with large flowers appearing in late winter and 'Praecox', with white, pink-flushed flowers blooming in early winter in mild climates. Subspecies *macranthus*, has spiny-toothed leaves and white, pink-tinged flowers borne well above the foliage. 'Allerseelen' and 'Mme Fourcade' have large pink-flushed flowers that are produced around Christmas time. 'St. Brigid' has blue-green leaves and pink-tinged flowers. 'Potter's Wheel' has large, rounded flowers with a green center.

Helleborus orientalis, the Lenten rose, so called because of its habit of flowering

in the 40-day period before Easter, is a highly variable species native to Turkey and Bulgaria, growing to a height of about 18 inches and a spread of about 24 inches. The leaves, produced from the base of the plant, are coarsely serrated, glossy, long-stalked, hand-shaped and divided into 5 to 11 lobed leaflets. Two to four inches wide, the flowers are produced from winter to spring. They range in color from pure white to deep purple, often flushed pale green, blotched or speckled with dark plum-purple spots. This species is hardy to -20 degrees F and tolerant of heat although different forms may be less winter hardy and less vigorous in hot weather.

The Lenten rose is easy to cultivate in ordinary fertile soil in part to full shade. It also tolerates dry soil, making it especially useful as an herbaceous plant under trees and shrubs. There are almost 60 named forms sometimes listed as separate species, cultivars or both. Subspecies *abchasicus* has maroon spotted purple-red flowers. Subspecies *guttatus* has greenish-pink flowers spotted purple.

Variety *atrorubens* has deciduous leaves and plum-purple flowers and is one of the earliest forms to bloom. Variety *olympicus* has green flushed white flowers. There are many cultivars, most of which are currently unavailable in North America. 'Heartsease' has maroon flowers, 'Winter Cheer' has white flowers flushed pink.

Two other species are worthy of mention. *H. argutifolius*, formerly named *H. corsicus* or *H. lividus* subsp. *corsicus*, is a native of Corsica, growing to a height of two feet and a spread of two to three feet, with leaves and flowers produced on thick stems. The leaves are gray-green, conspicuously veined and divided into spiny-toothed leaflets. Fifteen to 30 pale green, cupped flowers about one inch wide are

borne in clusters at the end of the flower stem in early spring. In good conditions in a mild climate this is an extraordinarily handsome plant, appealing not so much for its flowers as for its elegant foliage. It is a comely companion to snowdrops and crocuses and looks uncommonly pleasing in contrast with the dark purple leaves of the Labrador violet (*Viola labradorica*). This species has been hybridized with the Christmas rose to produce a hybrid group named *H. x nigericors*. One of the few commercially available cultivars, 'Alabaster', is a vigorous yet compact plant with white flowers. Not as hardy as the species already mentioned, the Corsican hellebore can sustain winter temperatures of about 0 degrees F. It is certainly not tolerant of hot weather and does not perform well in the sultry summers of the southeastern United States. It is best grown in light shade, protected from the midday sun.

H. foetidus, the stinking hellebore, is native to Western Europe, forming vigorous clumps up to 18 inches in height and spread. The leafy stems bear dark green leaves deeply divided into four to 11 narrow leaflets. The unpleasant smelling, bell-shaped flowers, one inch wide, pale green with maroon stained edges, appear in late winter and early spring in loose clusters at the end of the flower stem. This hellebore requires a neutral to alkaline, moist but well drained soil, in semishade or in sun. The pale green bells and the dark leaves make this a highly desirable plant for winter and spring display. It is slow to establish after division but self-sown seedlings are common. Hardy to about -10 degree F it also tolerates summer heat.

Flowering in the depths of winter and into spring, hellebores are a sign that winter bears life and that spring will once again arrive to restore us.

BULBS FOR WINTER GARDENS

BY CHARLES CRESSON



CHARLES CRESSON

The earliest spring crocus, often called snow crocus, bloom January through March, depending on climate and location. Above: *Crocus tomasinianus*.



Winter-blooming *Galanthus nivalis*, the common snowdrop, shows unfaltering tolerance to severe frost.

Never mind the December and March solstices — gardeners define winter by temperature. Winters are longer in the north, shorter in the south. There is another difference too. The low temperatures of a northern midwinter suppress all growth, while in the South moderate temperatures allow autumn bloom to overlap with that of winter, which in turn leads into spring without interruption. Many of these same winter flowers take an enforced rest in colder climates, and

bloom a month or two later. Whenever they appear, flowers braving brutal cold are an undisputed delight.

Bulbs are an essential component of winter gardens. They possess an unequaled ability to withstand hard frosts and exposure while in growth. In the South they are joined by a variety of shrubs, perennials and annuals which revel in the cool weather. Farther north, the bravest bulbs bloom alone, contributing animation to an otherwise stoic landscape of colored stems, evergreens and berries. Even as far north as zone 6 it is possible to achieve a continuous succession of bloom from fall through spring with the hardiest bulbs.

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Such hardy bulbs are snowdrops, *Galanthus*. spp. Even in the coldest spells their flowers show unfaltering tolerance to severe frost, bending to the ground, as if wilted, and recovering on the next warm day. The common snowdrop, *G. nivalis* (zone 3), blooms in February and March in my garden (zone 6) near Philadelphia, Pennsylvania, but the rarer subspecies *cili-cicus* blooms as early as late December or January. Another species, *G. elwesii* (zone 4), is larger and normally seen a couple of weeks before the common snowdrop, but it is variable, and some forms are also regularly seen as early as the beginning of January. Afficionados have noticed that within the same species, different stocks may have different bloom seasons, so it pays to obtain them from several sources.

Another variable species is *Galanthus caucasicus* (zone 6). In my garden, the earliest form flowers in December, others follow in midwinter, and the latest end the season in March.

Not only do snowdrops bridge the winter season, but they also begin it. The earliest to appear is *G. nivalis* subsp. *reginae-olgae* (zones 6 or 7), sending forth their blooms and foliage as early as late October. For hardiness and bloom season, snowdrops, in all their variety, are the quintessential winter bulbs.

Though less hardy in northern climates, cyclamen surpass even snowdrops for breadth of bloom season. They are a more Southern genus and only a few are marginally hardy in my garden. (Though some do survive in protected gardens farther north.) South of Philadelphia and on the West Coast, many species of cyclamen thrive, producing a succession of pink, rose or white blooms among their winter green foliage.

Cyclamen hederifolium (zone 6) is the

hardest and easiest to grow of the species. With flowers from August to October, it hardly fits my definition of a winter-blooming species, but its ivylike foliage is attractive from September through late spring. *C. cilicium* (zone 6) seems to be as hardy and picks up the season with late fall bloom beginning in October. *C. coum* (zone 7) and its many varieties produce their first flowers around January 1st, weather permitting, and continues well into spring. It is, in my experience, the most tender of the species mentioned here and requires a very protected location. I suspect a cloche placed over it during January and February would improve its performance.

Cyclamen prefer a woodland situation. In the north, grow them under evergreen trees for protection from winter sun to help preserve the foliage. In moderate southern climates, deciduous trees serve just as well. Plant them shallowly with a light mulch.

No winter garden would be complete without crocus. They too have a wide range of bloom seasons, but since their flowers are generally more fragile than snowdrop blooms, their flowering season is confined to the autumn and spring, except in the mild winters of the South. Among the more reliable species is the October-blooming *Crocus speciosus* (zone 5) in lavender blue or white with showy orange stigmas. In mild falls, flowers continue to appear sporadically into December. A later species which clearly struggles in my garden is *C. ochroleucus* (zone 7). Its foliage gallantly appears with small white flowers in November and December, hence the leaves have a better chance of surviving the winter in warmer climates.

The earliest spring crocus appear Jan-

uary through March depending on the climate and location. On a southern slope here they may appear in late January, but the flowers are more successful a couple of weeks later. These are often called snow crocus and include such species as *C. tomasinianus* (zone 5), *C. chrysanthus* (zone 4), *C. sieberi* (zone 6) and *C. susianus* (*angustifolius*) (zone 4) in the colors of the rainbow.

Even before the earliest crocus, winter aconite, *Eranthis hyemalis* (zone 4) springs forth with bright yellow buttercup flowers held four to six inches high. When content, in rich deciduous woods, they self sow with abandon to form a sea of gold.

Late winter brings a multitude of small bulbs capable of providing masses of color. The earliest daffodil, *Narcissus asturiensis* (zone 4), often shows its golden yellow trumpets in February. It is a perfectly hardy miniature trumpet only four inches tall. A welcome companion is the pale blue *Scilla tubergeniana* (zone 5).

Next are the jewellike dwarf irises with a fragrance of violets, for those who care to kneel on a warm day. They, too, are only 4 to 6 inches tall. *Iris reticulata* and the related species *I. danfordiae* and *I. histrioides* (all zone 5) range in color from blue to purple, reddish purple, yellow and even near-white.

Carrying the display into spring are the light lavender-blue glory-of-the-snow, *Chionodoxa luciliae* (zone 3), and deep blue Siberian squill, *Scilla sibirica* (zone 2). These two grow virtually anywhere, seeding themselves without much encouragement.

Crocus tulips are so called for their short four- to six-inch stature, wide flowers and early bloom. Such similar species as *Tulipa humilis* and *T. pulchella* (both zone 4) are the first of the tulip clan to bloom

with pink or reddish flowers and yellow or black centers. They prefer full sun to do their best.

It is perfectly understandable that bulbs bloom in winter or even fall. Many bulbs originate in Mediterranean climates where inhospitable, hot, dry summers force dormancy. The cooler seasons are both moist and mild. Growth cycles begin in autumn, continue through winter and end in spring.

Many plants prefer to bloom at the beginning of the growth cycle. Competition is also reduced at this season, since larger plants have lost their leaves and winter sun comes streaming to the ground. Summer dormancy also adapts many of these bulbs to dry shade, even among tree roots where other plants struggle. Most bulbs require good drainage.

Winter bulbs are small, compared to their later-flowering counterparts, as dictated by the necessities of the season. But they are strong and vigorous, often tolerating shocking degrees of frost without permanent damage. Near the northern limit of their hardiness, those with wintergreen foliage benefit from a light covering of evergreen boughs during the coldest months.

For the best effect use these diminutive early bulbs in mass plantings. Weave them in between and among winter-blooming shrubs, hellebores and annuals such as pansies to create complete garden compositions. Low groundcovers, such as sedums and ajugas provide a green background. Winter bulbs coexist well among the roots of deciduous epimediums and hostas, filling spaces that would otherwise be bare at that season.

Used abundantly, these small bulbs bring masses of life and color to the winter landscape.

WINTER-FLOWERING TREES AND SHRUBS

BY J.C. RAULSTON



The most noted of winter-flowering woody plants are the witch-hazels, which bloom in the dead of winter, notwithstanding severe cold and snow.

Above: *Hamamelis mollis*, Chinese witch-hazel.



Hamamelis x intermedia 'Ruby Glow'.



Hamamelis x intermedia 'Jelena'.



JERRY PAVIA

What is winter? In Minnesota and Florida, winter is vastly different, especially in terms of the plants that gardeners can grow. I will concentrate on the woody plants which perform well and flower in the mid-South Piedmont area, USDA zones 7-8, during the solar winter — December 22 to March 21 (winter solstice to spring equinox). However, many of these plants will grow in colder climates as well; check with your local nursery and Cooperative Extension office.

Why would a shrub or tree flower during this unfavorable season? Some late-fall-flowering plants continue to bloom sporadically during mild winters. Winter-flowering cherry, *Prunus subhirtella* 'Autumnalis', for example, may bloom anytime from October through March.

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A few other plants bloom at this same time regardless of temperature. The many witch-hazels, *Hamamelis x intermedia* cultivars, will bloom here and farther north even while snow is deep on the ground. Many of these true winter-flowering plants have evolved for the pollinators which are present at this time of year to ensure fertilization and seed production and therefore survival of the species. The often intense fragrance of these plants lures the pollinators. Gardeners reap the benefit.

There are also plants that will bloom when the flower buds' dormancy requirement is satisfied and the weather is warm enough for growth. Winter honeysuckle, *Lonicera fragrantissima*, is one such plant. Since this area of the South often enjoys early warm spells, this category of plants is quite important. Early flowering can also suffer from freezes that often follow, however. A classic plant in this category is the Yulan magnolia, *Magnolia denudata*. Several years ago, it was in peak bloom in mid-January — until a 15 degree freeze radically changed the scene. In my opinion, the glory of the good times is worth the agony of the occasional losses.

Many plants that bloom during brief warm spells have preformed flower buds from the previous growing season that require different degrees of chilling to break dormancy. A certain percentage of the buds open early, then another set for an entire bloom cycle. The Japanese flowering apricot, *Prunus mume*, is one example. It has bloomed as early as mid-December and it is a rare winter when the three to four weeks of blooming is not interrupted by a freeze or two. There always seems to be another set of buds for another blooming once the weather warms again.

It's ironic that a warmer than normal winter may result in less showy flower dis-

plays. With more warmth there will be fewer days of the required chilling cold that is needed to break flower bud dormancy. Warm winters may actually mean later blooming than usual.

Many experts recommended planting trees and shrubs on south-facing walls or in sunny, protected locations for winter bloom. These warmer microclimates will encourage earlier blooming, but the blossoms will also be vulnerable to frost. In their native habitat in Asia the early deciduous magnolias usually grow as understory plants in forests on north-facing slopes where cool temperatures delay flowering until frost is less likely. Gardeners must balance the benefits of the precious out-of-season bloom with the potential damage from frost. An alternative is to plant one plant in the warmest, most protected site on a property and a second in the coldest portion of the garden. This will provide insurance against damage and also lengthen the season of bloom.

Flowers are not always necessary for a beautiful and interesting display. Many species have showy winter buds which may look like flowers or can be just as striking. An example is *Skimmia japonica* 'Rubella', a two- to three-foot broad-leaved evergreen shrub which has three-inch clusters of bright red flower buds that are extremely attractive through the winter.

Two other, more commonly grown broad-leaved evergreen shrubs, *Viburnum tinus*, *laurustinus*, and *Pieris japonica*, Japanese pieris, also have attractive winter flower clusters — in addition to being early-blooming species. *Laurustinus* grows six to 12 feet high; cultivars with red buds are more showy through the winter. The flowers open white in March. *Pieris*, a white-flowered, three to six foot shrub, is widely grown. Among the many new culti-

vars are ones with red or pink winter flower buds.

The flower buds which attract the greatest attention in our garden in winter are those of *Edgeworthia papyrifera*, paper bush, a rare deciduous four- to seven-foot shrub native to Japan. The rounded heads of 30 to 40 whitish, tubelike flower buds nod from the tips of branches like small tassels in winter. They eventually open in mid-spring to two- to three-inch balls of white to yellow, slightly fragrant flowers.

The most noted of winter-flowering woody plants are the witch-hazels — six species and many hybrids of *Hamamelis*. *H. x intermedia* hybrids (*H. japonica* x *H. mollis*) are the showiest and most available. They are multistemmed deciduous shrubs six to 15 feet high. Over 25 cultivars with flower colors ranging from pale yellow through oranges to red are available from specialist nurseries. They always bloom in mid-winter, even in severe cold with snow.

The bright yellow flowered *H. x intermedia* 'Arnold Promise' is the most common cultivar, but it is among the latest of all the cultivars to bloom. For better true mid-winter flowering choose 'Primavera' (pale yellow), 'Sunburst' (bright yellow) or 'Ruby Glow' (coppery red).

The unsung hero and greatest glory of the winter-flowering woody plants is the magnificent Japanese flowering apricot, *Prunus mume*. This plant is highly revered by the Japanese who have created over 400 cultivars for their gardens, but we have yet to see them in the United States. It is a small deciduous 20-foot tree. The cultivars include a variety of plant forms — weeping, contorted and fastigiate, with single or double flowers in white through pink to red. They bloom from December through March, depending on the weather; late January is the most common peak period. The

flowers are intensely fragrant and a tree can scent an entire garden, or a single branch an entire house.

Several other trees offer late-winter flowers to brighten the short days of this gray period. Perhaps most common is the white-flowered star magnolia, *Magnolia tomentosa* (formerly *M. stellata*). It is the earliest blooming of the innumerable magnolias. There are many cultivars of this species, although some hunting may be needed to find them. All are small multistemmed deciduous trees normally eight to ten feet but reaching 20 feet with age. More unusual types include the pink-flowering cultivar *M. tomentosa* 'Rubra' or the many-petaled 'Centennial'. 'Jane Platt' opens to white from pink buds which are large with numerous petals. The Yulan magnolia, *M. denudata*, mentioned earlier is a larger tree reaching 30 to 40 feet. Its flowers have long petals of pure white and are fragrant. A specimen tree in peak bloom is a memorable sight.

The winter-flowering cherry, *Prunus subhirtella* 'Autumnalis', mentioned earlier, is a deciduous tree 20 feet high flowering sporadically with pink blossoms throughout mild winters. With this diffuse flowering it is never quite the knockout of other species which flower all at once. A lesser known, less hardy but incredibly spectacular species of early flowering cherry for winter in zones 8-9 is the Taiwan cherry, *P. campanulata*. It produces masses of showy deep pink to red flowers.

The cornelian cherries, *Cornus mas* and *C. officinalis*, multistemmed deciduous shrubs to small trees in the ten- to 15-foot range, brighten the winter garden with glowing yellow, fragrant clusters of small flowers. People accustomed to dogwoods as trees with large white bracts are always surprised to learn that these vastly differ-

ent plants are dogwoods. In addition to the flowers which bloom before forsythia, the plants also have attractive flaking bark.

Several additional deciduous shrubs add to the spectrum of winter-flowering plants. Flowering quince, *Chaenomeles speciosa*, has been a favorite of gardeners since the early 1800s. Its showy flowers open whenever there is a spell of a few warm days. There are over 150 cultivars of this three- to eight-foot densely branched shrub. Flower colors range from white through pink, orange and brilliant scarlet. Among some of the best and most available cultivars are: 'Cameo' and 'Toyo-Nishiki' with white, pink and scarlet flowers on the same plant.

Winter honeysuckle ("Breath-of-spring" in colloquial usage), *Lonicera fragrantissima*, is a common, large shrub to ten feet in diameter which bears small, fragrant white flowers throughout winter on warm days. Though rarely as spectacular in bloom as forsythia, its delicate lacy appearance and fragrance make it a favorite. Older plants can be limbed up to make small trees.

Equally familiar and widely planted is the aptly named winter jasmine, *Jasminum nudiflorum*, a smaller shrub with arching branches which reaches four feet in height. It is also an excellent plant for the top of a retaining wall where branches can cascade in a curtain of flowers. The flowers are bright yellow and can appear anytime during the winter after a few warm days.

Another longtime favorite which can bloom at any time of the winter with the proper weather is fragrant wintersweet, *Chimonanthus praecox*. This native of China forms an eight- to 12-foot shrub to small tree, producing starlike waxy flowers which are translucent yellow and sweetly fragrant. The one-inch flowers are rarely profuse enough to make a dramatic impact,



Among the many new cultivars of *Pieris japonica* are ones with red or pink winter flower buds.

but when backlit on a bright winter day their distinctive character makes up for what they lack in mass. Very fragrant, it is a favorite shrub to cut for winter forcing.

Various species of willows are often grown for their unusual showy catkins called pussy willows. The most commonly grown species is *Salix caprea*, but there are also several cultivars worth seeking out. *S. caprea* 'Pendula' is a weeping form of the common pussy willow which is often grafted high on a standard to form a cascading plant of great beauty when in bloom. *S. gracilistyla*, the rosegold pussy



Skimmia japonica's evergreen leaves and clusters of flower buds are attractive through the winter.

willow, is a smaller than normal pussy willow reaching five to seven feet in height. It has large catkins which appear relatively early, often flowering by Valentine's Day in this area. A newer species coming into the nursery trade is *S. chaenomeloides* from Japan. Not only are the very large catkins useful for winter interest, but the large, shiny, bright red winter buds make a stunning show after the leaves drop in the fall.

Least common of deciduous winter-flowering shrubs is the February daphne, *Daphne mezereum*, which flowers for four to five weeks in February and March in our



The quince's shawy flowers open during warm spells.



Several cultivars of the pussy willow are now available.



Magnolia tamentasa, star magnolia, is the earliest blooming magnolia.

area. It has showy pale purple fragrant flowers on a plant normally two to four feet in height. Like all daphnes, it can be difficult to establish. Lenten roses, *Helleborus orientalis*, with their white flowers and evergreen foliage, combine well with the leafless stems and purple flowers of the daphne.

Three broad-leaved evergreen shrubs can be added to this list. An evergreen daphne from China, *D. odora*, the fragrant or winter daphne, is an exquisite small shrub two to three feet high with glossy green leaves (or variegated white in one selection) and small, intensely fragrant flowers in shades of white and purple. It is difficult to establish, but worth any effort to do so.

Camellias are extremely common in the South. The two autumn-flowering species, *Camellia sasanqua* and *C. oleifera*, can bloom into mid-December, and the spring-flowering species, *C. japonica*, can begin blooming in late February to March. These classic southern plants form handsome specimens six to 15 feet in height. The three- to four-inch flowers are single or double, white through pink, lavender and bright red. *C. oleifera*, a single, white-flowered species, is the least common of this group. It is the hardiest camellia and can be grown as far north as zone 6. This species can easily tolerate short periods of -10 degree F.

There is a wide range of mahonia species and cultivars, but few are commercially produced. *Mahonia aquifolium* and *M. bealei* are the two most familiar. A series of rare hybrids are outstanding for their winter interest with spectacular December to January flowers in large terminal racemes of bright yellow, fragrant flowers. The American hybrid is *M. x 'Arthur Menzies'*, a cross of *M. bealei* x *M. lomarifolia*; English hybrids resulting from *M. japonica* x *M. lomarifolia* crosses include 'Buckland', 'Charity', 'Faith',

'Hope', 'Lionel Fortescue' and 'Winter Sun'. They are spectacular, some reaching 12 feet in height with two-foot inflorescences in mid-winter. All of them are very difficult to find, but I hope nurseries will continue to expand production as they are among the very best ornamental plants.

One rare native evergreen vine will complete this list, which could go on and on. Carolina jessamine, *Gelsemium sempervirens*, is widely grown in the South for its sheets of bright yellow fragrant flowers which appear from February to April, depending on location and weather. The rarer species, *G. rankinii*, swamp jessamine, blooms heavily in November, then sporadically through the winter with another peak in March. It can be grown on trellises, or allowed to ramble through shrubs and into trees, or without support can become a ground cover mat. Although the flowers are yellow like the Carolina jessamine, the swamp jessamine is not fragrant.

The winter-flowering woody plants appear much less commonly than other plants in our gardens because many people don't know about them. When *Prunus mume* or *Hamamelis* bloom in mid-January in an arboretum or garden center, few people are there to get excited about them and purchase them.

Many winter-blooming plants may be less interesting later in the spring season by comparison with the blaze of forsythias, cherries, azaleas and Bradford pears. Most retailers find the plants difficult to sell and instead stock the plants people want to buy. Consequently, wholesale growers find less demand for these relative unknowns and eventually shift their efforts to more marketable plants. Thankfully, there are specialist nurseries across the country who grow these gems of the winter garden. They can be found with some dedicated hunting. ✧

BARNARD'S INN FARM:

A WINTER WALK

ON MARTHA'S VINEYARD

BY POLLY HILL

My garden at Barnard's Inn Farm on Martha's Vineyard lies in deep repose. It breathes softly, imperceptibly. The shimmering flowers of summer, the riotous leaves of autumn are gone. What remains are the strong, enduring, sheltering and quiet forms of trunks and branches.

To walk in the winter garden is to make some discoveries: the elements of design, the contrasting shapes and textures and the silhouettes of deciduous trees, bare of leaves but still familiar. The bald cypress,

Taxodium distichum, shows its finely divided, orderly branching. The tulip tree, *Liriodendron tulipifera*, stands tall, its heavy branches turned up at the ends in characteristic fashion. Against a background of pines, bare reaching branches promise a season still to come.

At Barnard's Inn Farm stone walls built 100 or more years ago, when sheep were grazing the land, outline rectangular fields. On Martha's Vineyard the ocean environment shrouds the island in mist, fog or damp to the extent that the individual rocks in the lacy walls ("glacial pebbles," I am told) are greenish, yellowish or dull orange with lichens. In winter the lichens brighten and soften the surface of the walls. The stone walls provide a dominant architectural element that feels indigenous.

I have followed three design principles since beginning an arboretum from seed in 1958: Keep the centers of the field open, keep the walls clear of weeds and keep the plantings simple. For 300 years this old

POLLY HILL started an arboretum from seed in 1957 at her Barnard's Inn Farm on Martha's Vineyard in North Tisbury, Massachusetts. Since then she has grown and evaluated thousands of plants, selecting those that are hardy for Zones 5 and 6. Her work has led to the introduction of more than 60 ornamentals including her numerous selections of *Rhododendron* and *Ilex verticillata* 'Earlibright' and 'Tiasquam'.

sheep farm was gradually carved from the woodland where Indians had roamed. The homestead dates back to 1690. The scale of my garden is human. Rectangular fields on a level turf, enclosed by stone walls, provide a basic ground plan. I have planted about 20 acres surrounded by woods.

The West Field covers about five acres. Within it is a fenced area 300 feet by 35 feet which my husband christened the "Play-Pen." It is surrounded by a ten-foot fence to keep out deer. A conifer collection, planted outside the Play-Pen on the North, provides shelter from wind.

The North Field, about four acres, includes a pine grove, whose center shelters a bower — a partially secluded resting spot. Crabapples and viburnums are featured on the east and west sides of the field. A wildflower garden and lilac collection are planted near the large sheep barn.

Two smaller fields, the Vegetable Field and the Nursery Field, enclose a grove of stewartias, a rose bed, a caged blueberry planting and a pleached hornbeam arbor.

Sites have evolved over the years for large trees, a kousa dogwood allee, several borders and island plantings. They were not created all at one time. Growing my plants from seed allowed me several years to watch them in the nursery and decide on their niche in the garden.

Two large groups provide immediate visual impact in the winter: the conifers and the hollies. In winter the color green is the center of interest in the garden. All else is gray — tan-gray, black-gray or mixed tints of gray. The shingles on the buildings are dark gray, nearly black, from salt air; the grays of the walls, woods, deciduous trees and turf underfoot, all blend together in the winter



POLLY HILL

A view of the "Play-Pen," surrounded by a ten-foot fence to keep out the deer. A conifer collection planted on the north side provides shelter from the wind.

scene, and so the eye is drawn to green.

The list of the species of conifers that I have found to grow well on the island, after 20 to 30 years' trial, is a long one. What follows is a description of some of my favorites. The incense cedar, *Calocedrus decurrens*, I grew from Longwood Gardens seed. This massive, handsome tree, with splendid bark, is an eye-catcher in winter. Dark green, it is sturdy and thickly twigged. Not all young seedlings survived transplanting, but that is the beauty of a seed program. The plants that remain after 20 to 30 years are those that adapted to their environment.

Another winner is the Nordmann fir, *Abies nordmanniana*, a handsome tall tree with elegant branching and fat-needed twigs. The lower branches sweep the ground. It has grown well, resisting the winds with grace and health.

POLLY HILL



POLLY HILL



When leaves fall from the stewartias, above and top,
their mottled, many-colored bark is revealed.

The Japanese umbrella pine, *Sciadopitys verticillata*, is a plant of unusual distinction. The multiple whorls of shiny leaves, each gracefully curled, are smooth and agreeable to feel. This species succeeds handsomely in many island gardens, achieving far better forms than specimens on the mainland. It is slow when young, but so very worth waiting for.

Abies procera glauca, the blue form of the noble giant fir, is a native of our West Coast. This tree is indeed arresting. The whitish-blue color is its most conspicuous feature. The large, fat cones, which appear on relatively young trees, are 6 to 10 inches long and three to three and a half inches wide, and so erect in the upper branches that they suggest owls overlooking the fields. Their fresh fragrance tempts squirrels to chew or break them up, but the cones are difficult to dislodge and most survive. This fir has potential for enormous height. We shall see.

For many years, as Delawareans, my husband and I have loved the tall stands of loblollies, *Pinus taeda*, on the wide open fields of Sussex County on the Delmarva peninsula. At Barnard's Inn Farm ours were volunteers only inches tall that we moved from the sandy roadsides. Only a dozen survived. Now about thirty years old, their tall bare stems and graceful crowns give filtered light to ericaceous and other understory plants. Only a few have succumbed to the bark beetles that decimated the Japanese black pine, *Pinus thunbergiana*, and the Japanese red pine, *Pinus resinosa*, on the island.

The native white pine *Pinus strobus*

grows well if inland from the salt winds, but none have proved immune to salt burning where exposed. *

Two little-known pines also appear suitable in our environment: *Pinus lambertiana*, western sugar pine, and *Pinus strobiformis*. In youth they are lovely, exceptionally soft and thickly branched. They are still immature. Krussman lists *P. strobiformis* for zone 9, as it comes from Mexico and border states, but it appears quite content thus far in my zone 6 garden.

Among Japanese conifers three more are high on the list of desirables. Japanese white pine, *Pinus parviflora*, an evolving species, is variable and especially beautiful in its cultivated forms which the Japanese refer to as *Pinus pentaphylla*. The Korean pine, *Pinus koraiensis*, with longer needles and large sticky cones bearing edible nuts, is a good staple pine here. The third is *Cryptomeria japonica*, including its many forms. The tall cultivar, 'Yoshino', from the National Arboretum, is splendid. Like *Sciadopitys*, all the cryptomerias do better here than on many mainland sites.

Among the spruces my favorite is *Picea orientalis*. The very short needles are closely set and the whole tree is a rich dark green. The habit is orderly. For entertainment I grow *Araucaria araucana*, the monkey puzzle tree, from Chile and Argentina. It is hardy but slow and always brings a smile for its bizarre silhouette. *Chamaecyparis thyoides*, a native of wet lowlands, is surprisingly carefree and easy to grow in dry, windy, fully exposed sites in my open fields. A thickly fruited individual should be selected for the beauty of its greenish white cones, and planted in more diverse situations. Tall, narrow, pest free and undemanding, the eastern white cedar is a unappreciated native tree.

This listing of my favorite conifers is a

*Fossil pollens suggest that both *Pinus taeda* and *P. strobus* were growing here before the last glaciation. Barnard's Inn Farm lies directly below the terminal moraine.

sample of the many species from around the globe that ornament my winter garden. In addition there is one fir tree that I hope to introduce. The seed was given to me in 1959 as *Abies numidica*, but it appears to be instead *Abies lasiocarpa*, now about fifteen feet tall. Narrowly conical in shape, undemanding of space, it has rare distinction. How can I describe a tree whose form seems perfect to its many admirers? It is bluish green, disease free and adds special elegance to the winter garden.

By using the dwarfs and smaller forms of these and other conifers, we have created areas near a bench, inviting us to rest, look around and enjoy the wider view over the fields.

Not all the most conspicuous plants in my winter garden are conifers. There are also hollies, *Ilex*. Sunlight bounces off their leaves. The surface texture of conifers might be compared to fur. If so, then the surface texture of evergreen hollies suggests satin. These are *I. aquifolium*, our southern *I. cornuta* and the glossiest of the *I. opaca*. To easterners *Ilex opaca* is the Christmas holly. It is found wild from eastern Massachusetts to Arizona and Texas.

Native hollies on Martha's Vineyard are handsomely represented by the deciduous holly, *Ilex verticillata*, which is rapidly becoming popular. Locally it is called black alder or winterberry. The best easily available cultivar is 'Winter Red'. An outstanding hybrid from the National Arboretum is 'Sparkleberry'. A dwarf treasure is 'Rock Garden', bred by Elwin Orton at Rutgers University in New Jersey.

There is a group of seven wild cultivars selected and introduced by Barnard's Inn Farm. They differ in such ways as in early or late fruiting; in the colors of their berries, crimson, red or orange; in the size

of their fruits and in their plant height. The Vineyard strain has proved to be tough, exceptionally drought tolerant and highly stoloniferous. Their names are 'Bright Horizon', 'Earlibright', 'Tiasquam', 'Quitsa', 'Aquinnah', 'Short Cake' and the male 'Quansoo'.

Among the *Ilex opaca* selections I have named 'Martha's Vineyard' and 'Barnard Luce', both red-fruited females, 'Villanova', with yellow berries, and 'Nelson West', a narrow-leaved male. I also named 'Muffin', a dwarf male *Ilex crenata*, densely twiggy and hardy, from Japanese seed.

Another favorite is the long-stalked holly, *Ilex pedunculosa*, which makes a fine ornamental shrub or small tree during any season. *Ilex aquifolium*, the queen of them all, is on the edge of hardiness here. Nonetheless, 20-foot-high *I. aquifolium* males and females are flourishing. Among them are cultivars 'Ciliata Major', 'Camellifolia', 'Evangeline' and some unnamed seedlings of my own, which are proving to be attractive survivors.

In my winter garden there are also camellias, rhododendrons and mountain laurels in various shades of green that grow in the borders and islands, that edge the walks and accent the vistas. Because my garden is Zone 6, there is a limit to the broadleaved plants I can grow because of winter winds, cold or drought. The only truly hardy camellia is *Camellia oleifera* from China. It bears beautiful white blooms in October and November. A very few *C. japonica* and their hybrids survive, but are loath to produce flower buds in the average season. Those that do survive bloom in April. Their foliage is astonishingly thick and glossy. I remember that in Japan they grow on the edge of the sea and can be washed with salt spray.

I have also made a special effort to grow



A close look at the Nakaharae hybrid azalea 'Alexander' reveals a red-maroon color on the petioles, pointed flower buds and the occasional leaf in winter.

every species of tree or shrub known to attract birds. Winter birds clean up the crabapple fruits and shiny silver berries of the local red cedar, *Juniperus virginiana*.

When the earliest witch-hazel, *Hamamelis vernalis*, comes into bloom, waiting insects appear, attracted by the fragrant flowers, and the pollen. Chipmunks and rabbits come out of hiding when *Daphne mezereum* is bursting its buds.

Fragrant *Daphne genkwa*, from Korean seed, as beautiful as any orchid, is a late-winter bloomer, begging for a visit from color-hungry gardeners. The tiniest of daffodils, *Narcissus asturiensis* lifts its two inches through the snow even before the snowdrops are in bloom. *Cyclamen coum* can open its flowers in February and hold on until April, seeking what warmth it can find on clear days. Among early bloomers are the precocious magnolias, whose flowers open before the leaves are fully developed. In winter magnolia flower buds are wrapped in furry coats. All winter these fuzzy gray

points on the the end of every magnolia twig enrich the garden scene.

When leaves fall from the stewartia trees, their mottled, many-colored, bark is revealed. The bark of the paperbark maple peels off in rough brown curls. Small leaves of some rhododendrons contrast with big shiny leaves of others. *Rhododendron yakusimanum* 'Wild Wealth' holds a bald and glistening sphere, the size of a big marble, within a circle of leaves. This is the winter flower bud, formed in August.

Half hidden among the foliage of one of my groundcover azaleas, *Rhododendron* 'Louisa', is a witch's broom, a minutely dainty detail in an already fine-leaved plant. What mite chanced to feed there to make me such a gift? Or what fungus initiated this abnormality?

A close look at the the Nakaharae hybrid azalea 'Alexander' reveals that only in winter does a variable red-maroon color appear on the petioles and the pointed flower buds, and then splash a leaf here and there. When



In winter, ocean mists brighten green, yellow and orange lichens on the old stone walls which provide a dominant architectural element.

The shrub at center is *Caryopsis sinensis*.

winter sunlight slants at a deep angle into the garden, new shadows make new moods and patterns in once familiar places.

It is good to relax and reflect, once back in the warm house, that the garden is safe for now, at rest, restoring its energies. ✦



The strong, enduring, quiet forms of trunks and branches form a backdrop for the red fruits of the deciduous native holly, *Ilex verticillata*.

THE WINTER GARDEN AT THE SCOTT ARBORETUM

BY CLAIRE SAWYERS

Most of us tend to recognize three seasons in our planting schemes; rarely do we dream about winter gardens or plan and design gardens with that season in mind. To make home gardeners aware of plants that peak in the winter and to recognize the diversity of plants that provide solace during the dormant season, the Scott Arboretum has added a "Winter Garden" to the campus of Swarthmore College, which comprises the Arboretum.

The impetus for this garden was the construction of the college's \$14 million Lang Performing Arts Center (PAC). This contemporary structure, completed in 1991, would be most heavily visited by students and the community during the winter

months. The Arboretum staff wanted to make sure that while exciting performances were being staged inside, visitors would be greeted with an exciting outdoor performance.

While the planting around the PAC is larger than many home gardens, the ideas used here are applicable to suburban and urban gardens. For example, while winter concertgoers to the PAC may not brave the January chill to explore the Arboretum, they will enjoy the winter beauty of plants in this specially designed garden by attending some special event. The lesson here is to use plants with winter interest near doorways, entry walkways, driveways and garages since during winter our outdoor activities tend to be restricted to these areas.

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Through the Performing Arts Center's window walls visitors inside the lobby notice bright stems, waving clumps of ornamental grasses and a diversity of evergreen leaf textures. The huge windows provide and ornament the lobby like dramatic paintings. Even if you don't have windows

of this scale, the relationship between this building and garden illustrates the importance of reserving the vistas through your windows for plants that will inspire you throughout the cold months.

Plants that peak in this winter garden include trees, shrubs and perennials: *Acer palmatum* 'Sango Kaku', which when naked of leaves shows bright orange branches (living up to its common name of coral-bark maple), and *Salix alba* 'Snake' whose unusual fasciated (abnormally flattened and coalesced) growth is apparent once it sheds its leaves and whose pussies' silver hairs glow when back-lit by the late winter sun, and masses of witch-hazels. The Chinese witch-hazel, *Hamamelis mollis*, unrolls yellow petals on warm days beginning in February. The petals roll up again on cold days like party noisemakers. One of the Chinese witch-hazels, *H. mollis* 'Early Bright', a particularly early bloomer in the Winter Garden, is a selection named and introduced by the Scott Arboretum. *Cornus mas* should also be mentioned, for its clusters of pale yellow flowers outline the branches and give a halo effect in late winter.

There are winter-blooming shrubs in the Winter Garden as well, such as *Viburnum x bodnantense* 'Dawn' whose pink fragrant flowers brave the first warm winter days and *Jasminum nudiflorum* whose green low-arching stems cascade over walls and bring bright yellow flowers to the garden in late February or early March. *Sarcococca hookeriana* var. *humilis*, a low shrub used in mass as a ground cover, blooms in late winter too. Its tiny flowers would go unnoticed, nestled along the stems under the evergreen leaves, if it weren't for their sweet, powerful fragrance that pervades the air in late February and early March. *Ilex verticillata*, the winterberry holly, is another shrub best in winter.

Its summer flowers are insignificant, its foliage unnoteworthy, but in the fall and winter when its stems are laden with numerous bright red berries, it's a spectacle. There are a number of good cultivars of winterberry holly and several have been used in the Winter Garden.

In the shade of the building, beneath the trees and shrubs, hellebores send up white and rose colored pinwheel-like flowers in late winter. Nearby, *Heuchera americana* 'Dale's Strain' covers patches of ground with evergreen leaves mottled with white that have colored garnet in the winter. Here too are the big burgundy winter leaves of bergenias, *Bergenia cordifolia* 'Evening Glow'.

A variety of other plants found in this garden can't be said to peak in the winter but do offer substantial interest, and they provide a bonus of bloom during the growing season. *Crataegus viridis* 'Winter King', a tough hawthorn, has silvery branches with flaky mottled bark in winter, laden with bright red berries, followed by a cloud of white blossoms in the spring. Several cherries in this garden have satiny smooth orangish bark that is hard to resist touching and is of interest year-round: *Prunus* 'Okame', *P. serrula* and *P. subhirtella* 'Autumnalis', the autumn-flowering cherry. These cherries all contribute showy, pale pink blossoms in other seasons.

In the winter the oakleaf hydrangea, *Hydrangea quercifolia*, exhibits flaky-barked stems topped with brown papery flower heads that have persisted from the summer. If the old flowers are left, they last to greet the next batch of fresh white flowers. In addition, the bold leaves of this shrub develop maroon hues in the fall, if grown in sunny situations. This hydrangea should really be regarded as a four-season shrub.



The clusters of pale-yellow flowers of *Cornus mas*, Cornelian cherry, outline the branches in late winter and create a halo effect.

Viburnum dilatatum 'Erie' produces big clusters of plump red berries in the fall. As they persist through the winter, they shrivel but hold their color and remain attractive. Flat clusters of white flowers cover the shrub in the spring and so this plant has two strong seasons of interest.

At ground level *Geranium macrorrhizum* 'Spessart' and *G. cantabrigense* are being counted on for their persistent leaves that sporadically turn wine colored during the winter, but these geraniums are perhaps most vibrant when their flowers are open during the summer.

A variety of trees — pines, evergreen hollies and cedars — and a mix of ground-covers — Christmas ferns, (*Polystichum*

acrostichoides), *Cotoneaster salicifolius* 'Scarlet Leader', wild ginger, (*Asarum europaeum*), *Pachysandra procumbens*, *Euonymus fortunei* 'Longwood' and *Liriope muscari* 'White Monroe' have been included in the garden for their evergreen leaves. These plants provide a variety of shapes, forms and textures throughout the year.

As the Winter Garden illustrates, there are many plants to choose from in creating winter wonderlands. Over 75 kinds of plants were selected for this garden and the list of plants we'd like to add keeps growing. Our gardens needn't be devoid of winter interest and gardeners needn't give up on this season. ❄️

A SOUTHERN WINTER GARDEN

BY FELDER RUSHING



Camellia sasanqua, one of the most spectacular bloomers in the South's two-month winter season.

In *A Southern Garden*, Elizabeth Lawrence, perhaps the most thorough gardener to write of her beloved region's gardens, describes in detail the many woody and herbaceous plants of our "two months of winter." She strikes a

FELDER RUSHING is a horticulturist and seventh generation Mississippi gardener, author and photographer. His small cottage garden is packed with over 300 species of native plants and other popular hardy flowers rescued from Southern gardens.

tender chord in noting that "We do not have to wait for spring... After the slimy stalks of fall flowers have been cleared away...winter flowers begin to bloom."

Southern gardeners have plenty of chores to do in the winter, just raking leaves and mowing so-called "weeds" in the lawn. Cooking out, taking walks and gardening are popular pastimes, diversions from our bone-deep knowledge that, with little more than overnight notice, weeks of beautiful weather can and will turn chilly, wet, overcast and generally nasty for days on end.

Still, we have more winter vegetable gardens on average than the rest of the nation — we can eat from our gardens nearly all winter long. And we delight in tending oversize containers of shrubs, flowers and herbs through fair weather and foul. Through most of the winter greenhouses are harder to cool than heat; those of us who tend lots of potted tropical plants risk backaches from trotting them in and out of the house during fickle changes in weather.

Caught between the subtropics and more classic temperate zones, Southerners have had to fight for favorite landscape plants. Cold-hardy scattered remnants of ice ages past can be found in the South, left eons ago by glaciers pushing down from Canada. Yet growing side-by-side with tropical escapees from cultivated gardens, many suffer routinely from cold damage — even when the temperatures only hit the mid-teens.

It's not that the temperatures go all that low; they don't. All winter long there are weeks of warm days and moist soils, and it's not unusual to have flowering trees, shrubs, bulbs and other perennials in full bloom any day of the season. In such a relatively mild climate, it's easy to understand how an overnight drop of fifty degrees to even a very light freeze, after days on end of balmy, sunny weather, can wreak havoc in too-tender, sap-risen landscapes.

We've had to learn on our own which plants can take the pendular temperature and moisture effects. For example, an inquiry to the American Peony Society (Hopkins, Minnesota) for tips on those highly prized plants was answered with a curt "Sorry — peonies don't grow in the South." which simply isn't true. Generations of Southern gardeners have found, through trial and error, that the early-

blooming peonies are most likely to set bud in low-chilling areas and flower before spring temperatures cause buds to blast. 'Festiva Maxima,' a peony introduced in the 1860s, blooms easily and is passed around by all sorts of gardeners throughout the South.

A leisurely drive through small communities, especially in older neighborhoods and poor parts of town, can turn up some surprising finds. Wintertime, a season of landscape "bones," brings out the best examples of hardy shrubs and tough perennials. Looking past all the store-bought pansies and ornamental kale, an observant gardener will quickly notice such bulbs as oxalis, summer snowflake, *Leucojum* sp., and a double handful of multiplying daffodils, all blooming with little or no help even around abandoned homesites and in old cemeteries. Also common are naturalized masses of two daffodil species in particular, the reedlike jonquil, *Narcissus jonquilla* and multiple-flowered paperwhites, *Narcissus tazetta*, both with heady fragrance. Other aromas fill the air, from the shrubby star magnolia, sweet olive, winter honeysuckle and *Eleagnus*. Other shrubs having mid-winter blooms include *Camellia japonica*, *C. sasanqua*, spirea, forsythia, quince and mahonia. Bright berries are in abundance on hollies (especially notable are the native deciduous hollies), pyracantha and the ever-popular nandina — that is, until flocks of cedar waxwings devour every berry.

Birdwatching is a popular winter pastime, with many permanent residents and migratory northern species wintering in the South. Their songs, along with the antics of ever-active squirrels, provide a slice of life many gardeners appreciate. We regret the temporary loss of ruby-throated

hummingbirds and purple martins in early winter and leave feeders and gourd houses up for their February return. Macabre "trees" of round, brown gourds erected as martin houses stand starkly against the winter sky across the South.

Broadleaf evergreen shrubs serve as mainstays of most landscapes. They provide not only the interesting contrasts of texture and form so important to a winter landscape, but also a surprising amount of variation in hue and shade of green. Depending on the cultivar, the foliage of azaleas alone ranges from light to dark green to burgundy. Hollies are used extensively for their many forms, including generic "gumdrops" such as the dwarf Chinese and yaupon, to tree-form Burford and Foster hybrids and tall American hollies. Professional landscapers and cottage gardeners alike use a great many yuccas, especially the clump-forming, softer forms, *Yucca filamentosa*, along with *Nandina*, for winter texture. Two heavily-favored vines for late winter flowers, Carolina jessamine and coral honeysuckle, *Lonicera sempervirens*, are Southeast natives.

In addition to the overused pampas grass (hardly only in the middle and lower South), other ornamental grasses, including the trendy *Miscanthus* species, can be spotted in many old gardens and even cemeteries, standing out more in winter than in summer. The question of "to prune or not to prune" the old growth in the winter is a common source of argument in many households. North Carolina's Edith Eddleman pitches the idea of simply enjoying the winter effect, or, when it turns taupe after a freeze, spray-painting it in pastels, (unusual, but an enjoyable tweak against stuffiness).

Such widely-used ground covers as liri-ope, mondo grass, English ivy, *Vinca*

major, ajuga and Asiatic jasmine are also making strong inroads into contemporary gardens, as low-maintenance alternatives to turfgrass and for their yin/yang winter contrast with dormant turf and mulches. They really stand out in winter and reduce lawn chores.

It's easy to tell who uses chemical weed killers on southern lawns. The most popular turfgrasses are "warm season" perennial grasses such as St. Augustine, Bermuda, centipede and zoysia. By mid-winter, these turfgrasses are dormant, or nearly so. Their browned-out impact is dramatic, prompting visiting English gardeners to wonder if everything is dead. However, there are many overwintering annual and perennial "weeds" which, left alone, will appear like beacons in well tended lawns.

Most lie low from October until February, but grow rampantly in their late winter flowering phases. Dandelion, henbit, onion and garlic, clovers, *Ranunculus*, spring beauty and even seedling daffodils can quickly turn a lawn into a winter and spring wildflower meadow. This isn't necessarily a bad development, since most are controlled (if desired) simply by mowing in the early spring. They'll be back.

One of my earliest garden thrills was the realization that I was beginning to distinguish different bulbs and perennials by their winter foliage alone. "Gone down" at first frost are the hostas and most ferns, but *Aspidistra* and holly fern, *Cyrtomium falcatum*, remain evergreen in shaded gardens, along with an occasional clump of butcher's broom, *Ruscus*, or nippon lily, *Rhodea*. *Iris albicans*, or white flag, blooms are seen in nearly every neighborhood across the south, and woodland floors are brightened on frosty mornings with sweet violets, trillium, mayapple and blue phlox,

Phlox divaricata. Other outstanding perennials with winter foliage effects abound: fernlike yarrow, clumps of *Stokesia*, daylilies, *Arum italicum*, *Lycoris* species, *Artemisia* ('Silver King' is very common) and the always-dependable hellebores. Oddities such as the reedlike *Equisetum*, Spanish moss and hardy bromeliads, are much more noticeable in winter, along with carpets of scaly gray lichens, emerald mosses and shelf fungi on logs, stones and trunks.

Other than the afore-mentioned pansies, kale and dependable Johnny-jump-ups, few winter annuals are bedded out *en masse*. However, a plethora of overwintering biennials and short-lived perennials are set out, including hollyhocks, sweet Williams, lark-

spur, fennel, tulips and wildflowers such as coreopsis, queen Anne's lace and gaillardia.

In addition to these widely used landscape plants, garden artwork and hard features give a crucial lift to winter gardens. Human-scale ornaments ranging from fences, birdbaths, sculpture and other hard features fill the need for most gardeners, although a current trend seems to be towards the use of more natural material (boulders, logs, etc.). Compost piles are becoming more acceptable in this era of environmental interest, especially in light of legislation banning leaves and limbs from landfills.

Fellow Southerner Henry Mitchell, in *The Essential Earthman*, asked rhetorically, "What good would a whole orchard full of



A typical Southern lawn chair scene in mid-winter.



ABOVE: A typical Southern winter garden — *Camellia japonica*, smilax vine and nandina.

RIGHT: A ubiquitous gazing ball in February after two weeks of 70°F weather.

daffodils be, if our minds were preoccupied with palm trees?" In a land of six or seven garden seasons a year, which follow one another with little fanfare, the winter garden is only a little less busy than the rest. We may at first have to look harder for color, growth and fragrance, but it's all there. And for those of us who don't pine for other parts of the world, there are sweet rewards.

Southern herb guru Madalene Hill of Texas signs her books with the command "Grow where you are planted." Even in winter, that's saying a lot. *



A WINTER GARDEN IN MINNEAPOLIS

BY THOMAS R. OSLUND

*"Nature is full of genius, full of the divinity;
so that not a snowflake escapes its fashioning hand."*

Henry David Thoreau

During the long, cold midwest winter, most gardens are abandoned because of their seemingly monochromatic appearance. However, Thoreau's words became my inspiration for a garden that celebrates this magnificent season. In winter the elements of light, shadow, snow and sky may diminish a space, stroke a simple plane or create a sense of solidity. Understanding these elements makes the approach to creating a winter garden one of simple composition.

The Garden

The garden is located in Minneapolis, Minnesota, on a city lot measuring 45 by

THOMAS OSLUND grew up in Minneapolis and received his MLA at Harvard University. He is currently Vice President and Director of Landscape Architecture in Minneapolis.

150 feet that slopes upward some 30 feet towards the back of the property. A central axis is created by steps, a walkway leading to the front of the 1920s California bungalow and a crushed stone path leading from the back of the house to the rear property line. Walking up the front steps, one is drawn into the axis through a sloping mass of *Polygonum cuspidatum* var. *compactum*, fleece flower, an invasive groundcover with a wonderful texture and cinnamon winter color that identifies the garden's entrance. The walkway interrupts a hedge ring of *Thuja occidentalis* 'Techny', Techny arborvitae, five feet high that provides color and wind protection at the front entry. Within the hedge ring, *Berberis thunbergii* var. *atropurpurea*, Japanese barberry, and *Euonymus alata*, winged euonymus, recall the windrows of agriculture indigenous to this region. The euonymus, with its corky, horizontal branch

structure, provides a perfect shelf for snow where it elegantly contrasts with vertical foliage of arborvitae. Annual beds, located between hedgerows, allow snow to provide distinctive accent striping.

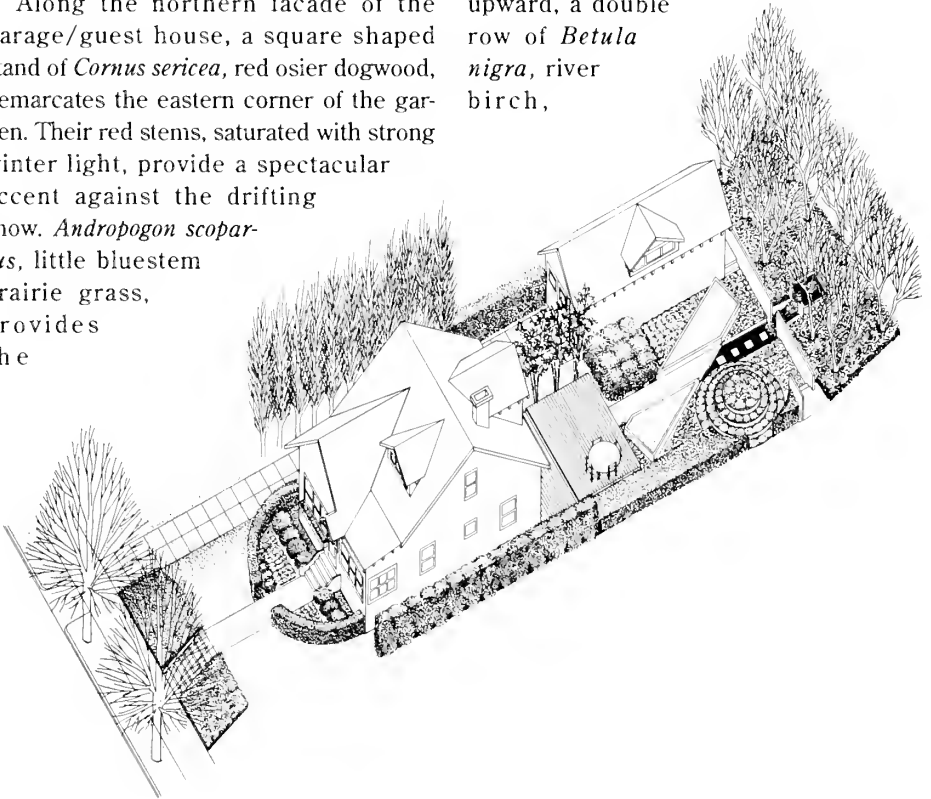
A straight gravel path continues the axis at the back of the house. A two-level deck terminates at a small reflecting pool and steam fountain. Between the deck and the fountain, a series of simple shapes and textures articulate the remainder of the garden. Framing the deck along its southern edge is a grove of *Phyllostachys aureosulcata*, yellow groove bamboo. The bamboo is intended to be wrapped with white fabric during the winter months for protection and unveiled once the spring arrives.

Along the northern facade of the garage/guest house, a square shaped stand of *Cornus sericea*, red osier dogwood, demarcates the eastern corner of the garden. Their red stems, saturated with strong winter light, provide a spectacular accent against the drifting snow. *Andropogon scoparius*, little bluestem prairie grass, provides the

ground texture for the rest of the garden.

The clump growth habit of this grass makes for an intriguing undulating pattern under a blanket of snow. Located within the prairie grass are the angled raised lawn areas and concentric perennial rings. These two elements are contained by native dryset limestone (Mankato Kasota Stone), selected for its rich golden color, contrast and its ability to reflect and illuminate the intense winter sun.

The one-foot elevated planes of the lawn platform and perennial rings allow snow to "ghost" the garden and long shadows to play off its contours. At the rear of the property, where the land slopes upward, a double row of *Betula nigra*, river birch,



WATER AT "STREAM"
FOLIAGE:

MANHATO KASOTA STONE
RETAINING WALL

WINGED EJONIMUS
EJONIMUS ALATA

GUEST HOUSE/STUDIO
GARAGE

LITTLE BLUESTEM
SCHIZACHYRIUM STIPARIUM

RED TWIG DOGWOOD
CORNUS SERICEA

TECHNY ARBORVITAE
ARBORVITAE OCCIDENTALIS
TECHNY

YELLOW GROOVE BAMBOO
PHYLOSACHYRIUS ALBOFUSCATA

BOLLEATA POPLAR
POPULUS ALBA 'BOLLEATA'

GRAVITE PAVES
ON DRIVEWAY

TECHNY ARBORVITAE
ARBORVITAE OCCIDENTALIS
TECHNY

DWARFED WINGED EJONIMUS
EJONIMUS ALATA

JAPANESE REDLEAF BARBERRY
BERBERIS THUNDERBOLT ATROPURPUREA

LAWN

LITTLE LEAF LINDEN
TILIA CORDATA

RIVER BACH GROVE
BETULA NIGRA

TAUNTON SPREADING YEW
TAXUS X MEDIA 'TAUNTONII'

MANHATO KASOTA STONE
STEPPING PLATFORMS

MANHATO KASOTA STONE
PERENNIAL RING
IRIS SIBIRICA
CAMPANULA LAPPACEA
VERONICA LATIFOLIUM
HOSTA LANCIFOLIA

MANHATO KASOTA STONE
RAISED PLATFORM

RAISED LAWN PLATFORM

CRUSHED GRANITE PATH

DWARF ALBERTA SPRUCE
PICEA GLAUCA 'CONICA'

TWO LEVE DECK

UPRIGHT JAPANESE YEW
TAXUS CUSPIDATA 'CAPitata'

JAPANESE SPIRGE
PACHYRANDRA TERMINALIS

MAIN RESIDENCE

ANNUALS

ANNUALS

FLEECEFLOWER
POLYGONUM CUSPIDATUM VAR
COMPACTUM

LITTLE LEAF LINDEN
TILIA CORDATA

frames the view to the fountain. The tan, peeling birch trunks create an evenly spaced pattern of vertical forms.

Taxus x media 'Tauntonii', Taunton spreading yew, provides a contrasting evergreen groundcover beneath the birch grove. In front of the birch grove, a four-foot high limestone dryset stone wall takes up the change in grade. Its rough textured surface provides yet another contrast between the birch and snow. The steam fountain cascades two feet into a cistern pool, spills through the retaining wall, and drops another two feet to a reflecting pool with stepping platforms.

The northern property line is defined by two types of evergreens, *Taxus cuspidata* 'Capitata', upright Japanese yew, and *Picea glauca* 'Conica', dwarf Alberta spruce. These evergreens screen the garden from adjacent properties and help protect it from the prevailing winter winds.

The southern property line is composed of *Populus alba* 'Pyramidalis', Bolleana

poplar, *Thuja occidentalis* 'Techny' and *Euonymus alata*. The line of poplars defines the driveway edge and allows the low winter sun to penetrate the rest of the garden, creating intricate shadow patterns across the granite drive.

This winter garden begins to explore the subtle, yet intricate, balance among the elements of shadow, light, snow, stone, steam and plants to bring new life to a place usually perceived to be dormant. Unlike a summer, fall or spring garden, a winter garden gives a sense of life that cannot be achieved simply with the growth and change of plants. One must begin to understand, as Thoreau did, the structure of nature and the inherent qualities and forces acting upon nature. By understanding these intricacies, and artfully composing the garden's elements, one sees the endless possibilities for a winter garden landscape. Not to mention the garden's year-round possibilities. ✧

THOMAS R. OSUND



The clump growth habit of little bluestem makes for an intriguing undulating pattern under a blanket of snow.

A CALIFORNIA GARDEN IN WINTER

BY MARSHALL OLBRICH

California gardeners, especially those in its coastal areas, share a "Mediterranean climate." This means six months of warm, dry weather, followed by six months of colder rainy weather. Disregarding the drought of the last few years, the amount of annual rainfall in different parts of California varies widely. The southern counties are very dry, San Diego receiving a very few inches; in central California rainfall is more moderate, the Bay Area around San Francisco receiving 22 inches, and in the north, the rain in some places exceeds 100 inches.

My garden is in the coastal redwood area about 60 miles north of San Francisco. On average, we get 60 inches of rain which, compressed into the winter months,

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makes for a high water table and generally soggy soil. Climate extremes are not so much between cold and hot, as between too much water in winter and too little in the summer. The roots of many plants do not grow below the water table, which can be only a foot or two below the surface. The danger is that plants may have roots too shallow and insufficient to withstand the long dry season.

Our temperature range is broader than that in fog-cushioned San Francisco. On the positive side, our additional heat (up past 90 degrees F at times) allows us to flower plants like *Daphne odora* and obtain viable seed on some maples. On the other hand, our low temperatures (with some nights 25 degrees F or lower) rule out subtropicals like *Bougainvillea*, *Lantana*, *Heliotrope*, *Poinsettia*, *Pelargonium* and other plants commonplace in the Bay Area.

In fall and winter, we share three groups of plants with eastern and midwestern gardeners: hardy perennials, which

tend to bloom very late in the year, trees with fall color, and ornamental grasses. Though our trees can't compare in color with eastern forests, we have a few successes. The bald cypress, *Taxodium distichum*, now 30 years old, is very striking with its fox-red deciduous foliage. (This year its "evergreen" Mexican counterpart, the Montezuma cypress, also colored and lost its needles.)

The sweetgum, *Liquidambar styraciflua*, and keaki elm, *Zelkova serrata*, color well, as does the coral-bark variety of Japanese maple, *Acer palmatum* 'Sango Kaku'. Two trees are unusual here in the lateness of color and leaf-drop: The Mexican hawthorn, *Crataegus pubescens*, may be in color as late as February. A striped-bark maple from Taiwan, *Acer morrisonense*, will color and drop its leaves as late as the end of January, with spring growth starting almost immediately, so that by March it is full again.

In general, however, fall color is poor and disappointing. Because of our dry and warm September and October weather, trees famous for their color, like the quaking aspen, the katsura tree (*Cercidiphyllum japonicum*) *Parrotia persica* and others dry up and drop their leaves with no ceremony at all.

Grasses are as important in winter here as they are in the East, providing accents in otherwise blank areas. We tend to associate them with more tender spiky plants like New Zealand flax, *Phormium tenax* — in the newer, highly colored, varieties — and *Dasyliiron* spp., western plants which make symmetrical six-foot mounds of needle sharp foliage. Pampas grass, in its variegated varieties, grows well, and its New Zealand relative, *Cortaderia richardii*, with lovely one-sided feathery flower heads, is an asset. Large grasses such as the bluish

Mediterranean evergreen *Helictotrichon sempervirens* and *Miscanthus* species are basic to our winter garden.

As December approaches the elegant small-leaved and small-flowered camellias start to bloom. In general, these are smaller shrubs of great beauty and distinction, but sadly of limited availability. With new species being imported, this group is being hybridized for greater hardiness and certainly should be tried in the milder parts of the eastern United States. We also can grow a number of plants, mostly from Mexico, which, frankly, are more tender but very spectacular, blooming in mid-winter. Foremost of these are the tree dahlias, *Dahlia imperialis* and related species, which may reach 20 feet with feeding and watering; and the giant bushy sages, *Salvia* spp., ranging from deep red to rose pinks, to many shades of blue or purple, and to the clear yellow of *Salvia maderensis*. These sages may range from five to 15 feet high.

I wish this were the end of the story. Unfortunately, during December of 1990, we had, along with most of coastal California, the longest and most devastating freeze in 60 years. We had a warning in 1972, when temperatures went down to 14 degrees F for several nights and stayed below the freezing point for two weeks. We had rashly planted West Australian and South African trees and shrubs, little known in cultivation at that time, and so lost a third of our garden.

The recent cold spell was more extreme and prolonged, going down to an unprecedented 10 degrees F for several nights and not rising above the freezing point for weeks. We were no longer growing the West Australian trees and shrubs, but had disastrous damage to others assumed to be hardy here. The showy Mexican dahlias

and sages turned into limp, gray ghosts. Among those affected were two shrubs possibly familiar to southeastern gardeners — *Mahonia lomariifolia*, already in full golden bloom, but losing its flowers and new growth, and *Loropetalum chinense*, again in bloom but alive only as a large mound of dead gray leaves.

New Zealand plants suffered the most unexpected damage — Australian tea bush, *Leptospermum scoparium* and its varieties, were killed outright. Since they, along with the red bottlebrushes, were common plants in the coastal redwood area, evidence of their destruction is everywhere. Other New Zealand plants that may be familiar to southeastern gardeners are *Pittosporum* spp., sometimes killed, sometimes unharmed, and the *Veronica* relatives, the *Hebe* spp., again damaged in different degrees. The colorful forms of New Zealand flax, *Phormium* varieties, and the cabbage tree, *Cordyline* spp., may or may not recover.

As I write in late January, we are hoping that with warmer weather we will find new shoots on some plants, but equally fearing that warmth will kill apparently healthy plants whose roots have rotted. Most of the Bay Area gardens and nurseries are in the same predicament.

Although it's hard to think positively at this point, the disaster can be seen as an opportunity to make an essentially new garden. After all, as it has aged over 30 years, the garden has become too shady. So we are casting a cold eye on even prospering trees and shrubs, with the aim of letting in more light and replanting with hardier perennials and shrubs. Doubtless we shall, sooner or later, succumb to plants of borderline hardiness. If our own resilience doesn't melt away, we will have a pleasing garden once again.



Populus tremuloides, foreground, and the fox-red deciduous foliage of bald cypress, *Taxodium distichum*.



Spectacular flowering sages, top and above, from Central and South America bloom in midwinter in California but suffered during the devastating freeze of December 1990.

A WINTER GARDEN IN CAMBRIDGE

BY PETER ORRISS

A walk through the Winter Garden at Cambridge on a clear, crisp, winter morning is an exhilarating experience. The color, form and charm cannot be equaled in any other season. Although frost and snow may enhance the scene in the garden during the winter months, they are not necessary here, for the attraction is flower, foliage, fruit or colored bark. Selecting plants and putting them together in a confined area is what garden artistry is all about, but to do this in what is considered by many to be the dormant season is comparatively recent and becoming fashionable.

The climate in Cambridge in many ways is more suitable for winter display than elsewhere, for there are many clear bright days and this enhances the color of stems. The low angle of the sun provides silhouette and contrast of sun and shade. The bright days are often associated with low temperatures, and although there is little protection in East Anglia from the Arctic cold, Cambridge is only 40 feet above sea-level, and sub-zero temperatures are rare

and seldom last long. The wind chill is serious and desiccation of foliage can occur in Cambridge. Rain and snowfall are light — an average of 21 inches of precipitation per year. Irrigation is essential during most summers to encourage strong annual growth. The soil, a thin, impoverished alluvial river bed with a pH of 7.5, is well drained alkaline overlying gravel.

The idea of creating a winter garden at Cambridge was first conceived in 1951 by John Gilmour, then Director of the Cambridge Botanic Garden. Designed as a formal feature within the Botanic Garden, the Winter Garden formed a long, narrow corridor linking the mature half of the Garden dating back to 1846 with an adjoining part of the garden developed since 1951. In the 1970s, out of the need for more research space and the reluctance to dispose of the winter display, the decision was made to relocate the Winter Garden to another area in the Botanic Garden.

An open area of approximately 100 yards by 35 yards was selected to separate the refreshment area and the more scientific areas of the Garden. In an effort to make it a low-maintenance garden, the formal design of the original garden was abandoned and a theme was developed using

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different groundcovers. Those who know Cambridge will know that undulation, however small, is at a premium — the Garden is as flat as the proverbial pancake and as flat as the surrounding Fens of East Anglia. Undulation had to be created and is now the strongest design element of the garden. We are extremely pleased that we went to the expense of creating a shallow depression through the central area of the Winter Garden. Two shallow valleys, facing southwest and southeast (to maximize the angle of the winter sun) were also created to form banks for the low prostrate plants to tumble down and to provide higher points on which to plant flowering shrubs and small trees.

The Winter Garden is protected by *Taxus baccata* on the North side; *Thuja occidentalis* to the West and *Cupressocyparis leylandii* 'Haggerston Gray', leyland cypress, to the East. Because the garden runs East to West, low-growing hedges were planted along the South side, providing an enclosed area with open views (over the tops of the hedges) from a main path outside the Winter Garden. A winding gravel path leads visitors into the Winter Garden.

The framework of the Winter Garden was established with standard trees strategically placed throughout to give focal points and to screen unsightly background objects. Flowering trees in winter are limited to early flowering cherries, *Prunus subhirtella* 'Autumnalis', a must with its profusion of dainty white flowers first appearing in November and continuing into January; a very close second is the form 'Rosea' with pinkish tints. Both are deserving of their prominent positions in the Garden. The two forms of *Prunus davidiana*, 'Alba' and 'Rubra', are free-flowering in January, provided the weather is not too severe, while later *Prunus incisa*

'February Pink' and later still, in March, *Prunus hirtipes* herald the spring-flowering Japanese cherries in other parts of the Garden. *Prunus serrula* with its beautiful, polished mahogany bark is worthy of a place in any winter scheme. The crabapple *Malus* 'Red Sentinel' is by far the most successful fruiting tree we have, the large red fruits persisting well into January.

Additional height and interest can be achieved by the use of trees with attractive barks, and my favorite is *Betula alba sinensis* var. *septentrionalis*, an Asian species with very attractive peeling bark of shiny flesh color. One of the better white-stemmed birches is the one raised at Hilliers Nurseries at Winchester called *Betula* 'Jermyns'. The snow-white peeling bark retains its whiteness for many years. Maples, too, offer one or two species with attractive bark; none more so than *Acer griseum*, the paperbark maple from central China which displays brilliant crimson autumn foliage and whose main trunk and primary branches flake with curls of shaggy, rich, deep, rusty bark. *Acer grosseri*, also from central China; *Acer capillipes* from Japan; and *A. pensylvanica* from North America, are three maples that produce interesting striated or snake barks, prominent in the dormant season.

Lawson's cypress and other conifers provide a diversity of shape and color. The golden yellow form *Chamaecyparis lawsoniana* 'Winston Churchill' is one of the best yellow forms, while 'Pembury Blue' is a good blue-gray.

The flowering shrubs provide not only the intermediate or eye-level layer of the Garden, but also the perfume. It still remains a mystery to me why so many of our favorite winter-flowering shrubs such as *Chimonanthus praecox*, the winter sweet, *Hamamelis*, witch-hazel, *Lonicera*

sp., the winter-flowering honeysuckle, and many of the viburnums have such sweet scented flowers and yet very few insects are about for pollination. Their loss, however, is our gain and one cannot but want to plant as many of these shrubs as space allows. In the late autumn and early winter the sweet scent of viburnums fills the air. The first to flower is *Viburnum farreri*, which flowers in October before autumn leaf fall and continues on and off into February and March, depending on how severe the weather is. A little later, in November, *Viburnum bodnantense* 'Dawn' flowers with its deep pink, scented flowers — a much larger and more vigorous shrub than *V. farreri*.

With the turning of the year, many old favorites begin to show that spring is not too far away: the winter-flowering jasmine, *Jasminum nudiflorum*; the honeysuckles, *Lonicera fragrantissima*, *L. standishii* and their hybrid *L. x purpusii*; the witch-hazels, *Hamamelis mollis*, *H. x intermedia* 'Jelena' with orange flowers and the deep red form 'Diana', making a complete contrast to the more common yellow-flowering types. One of my favorite plants in the Winter Garden is the pale yellow form of winter sweet, *Chimonanthus praecox* 'Luteus', sometimes known as *C. praecox* 'Concolor'. To me, it is a far superior plant to the type. Well worth the ten year wait, it is finally beginning to flower profusely with little waxy, bell-shaped, scented flowers of lemon yellow.

The most striking impact of the whole Winter Garden is made by the use of colored stems. The young growth of a number of different genera provides color throughout the winter season. During the dull days of early winter nothing shows up quite so well as the white stems of the bramble from the Himalayas, *Rubus biflorus*. The white "bloom" which appears

TIM BOLAND



only on the young growth gradually wears off within the first year. The stems then become a brownish color which, if left, will produce a good crop of orange-colored blackberries. To maintain a good supply of young white stems, these fruiting shoots should be cut down each spring, as soon as young growth starts to appear at the base of the plant. Ideal for brightening a dark



The color, form and charm of the Cambridge winter garden is unequalled in any other season.

corner of the garden, this bramble shows up well against the dark green of a yew hedge — especially on a moonlit night!

Planted in irregular blocks, the bright red stems of *Cornus alba* 'Sibirica' and the contrasting yellow stems of *Cornus stolonifera* 'Flaviramea', make a bold splash of color. The yellow-stemmed form is a more vigorous plant; therefore, to achieve

a balance of contrast, more red-stemmed plants are needed. Although the Cambridge garden is relatively dry, the orange-red *Salix alba* var. *chermesina* and the grayish-white of *Salix irrorata* have proven to be the two most exciting and successful willows. *Salix irrorata* has an added bonus of yellowish-orange catkins in the spring. to get the best effect from colored-

stemmed plants, they must be pruned back each year in the spring, for it is the long, thin, annual growth that produces the color. Because the red-stemmed *Cornus*

are not as vigorous we reduce the crown by half each year rather than cut back to the ground.

To complete the overall picture, the

CAMBRIDGE WINTER GARDEN PLANTS

TREES WITH FLOWERS OR ATTRACTIVE BARK:

Acer capillipes

A. grosseri

A. grosseri var. *hersii*

Betula albo-sinensis var.

septrionalis

B. 'Jermyns'

Malus 'Red Sentinel'

Prunus davidiana 'Alba'

Prunus davidiana 'Rubra'

P. hirtipes

P. incisa 'February Pink'

P. hirtipes

P. mume 'Alphandii'

P. rufa

P. subhirtella 'Autumnalis Rosea'

Sorbus acuparia 'Rubra'

SHRUBS: FLOWERING/FRUITING:

Arbutus unedo 'Rubra'

Berberis wilsoniae 'Gerdien'

B. wilsoniae 'Marianne'

Chimonanthus praecox

C. praecox var. *grandiflorus*

C. praecox var. *praecox*

Colletia armata

C. cruciata

Cornus mas

C. mas 'Variegata'

Cotoneaster horizontalis

C. lacteus

C. microphyllus var. *conspicuous*

C. salicifolius 'Autumn Fire'

Erica carnea 'Aurea'

E. carnea 'Fox Hollow'

E. carnea 'James Backhouse'

E. carnea 'King George'

E. carnea 'Snow Queen'

E. carnea 'Springwood Pink'

E. carnea 'Vivellii'

E. erigena 'Superba'

E. erigena 'W.T. Rackliff'

Hamamelis japonica

'Zuccariniana'

H. mollis

H. mollis 'Pallida'

H. x intermedia 'Diane'

H. x intermedia 'Jelena'

Ilex x altaclarensis 'J.C. van Tol'

Lonicera fragrantissima

L. setifera

L. standishii

L. x purpusii

Mahonia japonica

M. x media 'Winter Sun'

Stachyurus praecox

Symphoricarpos 'Hancock'

S. 'White Hedge'

Viburnum carlesii

V. farreri

V. foetens

V. tinus

V. tinus 'Lucidum'

V. tinus 'Variegatum'

V. x bodnantense 'Dawn'

ground cover and ground flora were drifted throughout the garden. It is important not to be too formal or regimented when filling in the areas between the principal plants. A natu-

ralistic approach with disregard to exact spacing and using groups of irregular sizes and shapes enhances the overall effect. Never plant in a straight line at equal distance!

E. terminalis
E. x darleyensis 'George Rendall'
Forsythia girdaldiana

V. x bodnantense 'Deben'
V. x juddii

SHRUBS WITH COLORED STEMS OR GROUND-COVER FOLIAGE:

Berberis dictyophylla
B. wilsoniae 'Gerdien'
B. wilsoniae 'Illse'
B. wilsoniae 'Marianne'
Cornus alba 'Kesselringii'
C. alba 'Sibirica'
C. stolonifera 'Flaviramea'
Euonymus fortunei var.
radicans 'Variegatus'
Hedera colchica 'Dento-variegata'
H. helix 'Buttercup'
H. helix 'Glacier'
H. helix 'Gold Heart'

H. helix 'Little Diamond'
H. helix 'Lutzil'
H. helix 'Marmorata'
H. helix 'Meagheri'
H. helix 'Sagittifolia Variegata'
Ilex aquifolium 'Silver Queen'
Mahonia aquifolium 'Atropurea'
Rubus biflorus
R. niveus
Salix alba var. *chermesina*
S. irrorata
Stranvaesia davidiana

CONIFEROUS PLANTS:

<i>Chamaecyparis lawsoniana</i> 'Kilmacurragh'	<i>J. virginiana</i> 'Grey Owl'
<i>C. lawsoniana</i> 'Pembury Blue'	<i>Taxus baccata</i> 'Fastigiata Aurea'
<i>C. lawsoniana</i> 'Winston Churchill'	<i>T. baccata</i> 'Semperaurea'
<i>C. lawsoniana</i> 'Wisselii'	<i>Thuja occidentalis</i>
<i>Cryptomeria japonica</i> 'Elegans Compacta'	'Ellwangerana'
<i>Cupressus glabra</i> 'Conica'	<i>T. occidentalis</i>
<i>Juniperus chinensis</i> 'Stricta'	'Ericoides'
<i>J. virginiana</i> 'Burkii'	

BULBOUS AND HERBACEOUS PLANTS:

<i>Bergenia cordiflora</i>	<i>Helleborus foetidus</i>
<i>Crocus biflorus</i>	<i>H. guttatus</i>
<i>C. chrysanthus</i> 'Snow Bunting'	<i>H. lividus</i> spp. <i>corsicus</i>
<i>C. sieberi</i> var. <i>atticus</i>	<i>H. niger</i>
<i>Chionodoxa sardensis</i>	<i>H. orientalis</i>
<i>Eranthis hyemalis</i>	<i>Hyacinthella azurea</i>
<i>E. x tubergenii</i>	<i>Narcissus jonquilla</i>
<i>Galanthus</i> spp.	<i>Scilla siberica</i>

The lime-tolerant winter-flowering heathers, cultivars of *Erica carnea* and *Erica x darleyensis*, were used predominantly in the more open spaces. Although there are a considerable number of named varieties of heather, they only appear in shades of red, pink and white and there appears to be little to choose among them. *E. x darleyensis* varieties are more vigorous and make slightly larger plants. Ivies of different leaf form make ideal ground covers at this time of year and also provide summer interest. The large creamy-green variegated leaves of *Hedera colchica* 'Dentato-Variegata' give a bold display, while the smaller silver gray leaves of *Hedera helix* 'Glacier' certainly live up to their name on a crisp, frosty morning. We have this plant tumbling down a shallow bank in a serpentine band, looking like a miniature glacier.

Euonymus fortunei 'Silver Queen', with its

interesting leaf variegation of cream tinged with purple on a dark-green background, makes an ideal groundcover for winter effect and, interplanted with the red stemmed *Cornus*, is a combination well worth repeating. Some of the best combinations are the result of planting bulbs or corms with shrubs or herbaceous plants. I particularly like the combination of *Scilla sibirica* under the early-flowering *Forsythia giralddiana*; blue and yellow make a delightful picture.

There is no doubt that if climate and soil are conducive, plants in winter can give a long lasting display. With careful selection of plants for form, texture and variegation, a winter garden can be attractive from October into April. In the Cambridge University Botanic Winter Garden many people have the opportunity to see and enjoy these plants during an otherwise dreary time of year. ❄



Planted in irregular blocks, the bright red stems of *Cornus alba* 'Sibirica' and contrasting yellow stems of *Cornus sericea* 'Flaviramea' provide bold splashes of color.



Conifers provide a diversity of shapes and colors.



Ground covers are planted in naturalistic drifts throughout the garden.
In bloom at center is winter aconite, *Eranthis hyemalis*.

WINTER GARDEN SOURCE LIST

The following is a list of selected nurseries which carry hard-to-find plants. (Unfortunately, we don't have the space to list them all.) If you can't find one of the species or cultivars mentioned in this handbook at your favorite nursery, check the sources listed below.

BULBS

DAFFODIL MART
Route 3, Box 794
Gloucester, VA 23061
804-693-3966

MONTROSE NURSERY
P.O. Box 957
Hillsborough, NC 27278
919-732-7787

MCCLURE AND ZIMMERMAN
108 West Winnebago
P.O. Box 368
Friesland, WI 53935
414-326-4220

P. AND J. CHRISTIAN
P.O. Box 468
Wrexham, Clwyd
United Kingdom LL13 9XR(0978)
366 399

DECIDUOUS HOLLIES

BULL VALLEY RHODODENDRON NURSERY
214 Bull Valley Road
Aspers, PA 17304
717-677-6313

CARROLL GARDENS
444 East Main St., Box 310
Westminster, MD 21157
301-848-5422

EASTERN PLANT SPECIALTIES
Box 226
Georgetown Island, ME 04548
207-371-2888

GREENBRIER FARMS, INC.
201 Hickory Road West
Chesapeake, VA 23322
804-421-2141

PRINCETON NURSERIES
P.O. Box 191
Princeton, NJ 08542
609-924-1776

ROSLYN NURSERY
211 Burrs Lane
Six Hills, NY 11746
516-643-9347

MAGNOLIA NURSERY
Route 1, Box 87
Chunchula, AL 36521
205-675-4696

HELLEBORES

FORESTFARM
990 Tetherow Road
Williams, OR 97544
503-846-6963

GOSSLER FARMS NURSERY
1200 Weaver Road
Springfield OR 97478
503-746-3922

GREER GARDENS
1280 Goodpasture Island Rd.
Eugene, OR 97401
503-686-8266

MAPLETHORPE
11296 Sunnyview NE
Salem, OR 97301
503-362-5121

SHADY OAKS NURSERY
700 19th Avenue N.E.
Waseca, MN 56093

SISKIYOU RARE PLANT NURSERY
2825 Cummings Road
Medford, OR 97501
503-772-6846

SUNNY BORDER NURSERIES INC.
1709 Kensington Rd., Box 86
Kensington, CT 06037
203-828-0321

WINTER SURVIVAL TACTICS



To relieve the winter
doldrums, force
bulbs indoors.

Have your child
assist you in turning
the Christmas tree
into mulch.

ELVIN McDONALD



FELDER RUSHING

THOMPSON AND MORGAN
P.O. Box 1308
Jackson, NJ 08527
201-363-2225

ANDRE VIETTE FARM AND NURSERY
Route 1, Box 16
Fishersville, VA 22939
703-943-2315

ELVIN McDONALD



Use
antidesiccant
sprays to protect
plants in winter.

Liven up the winter
garden with a
creatively wrapped
shrub.

ELVIN McDONALD



ORNAMENTAL GRASSES

KURT BLUEMEL, INC.
2543 Hess Road
Fallston, MD 21047
301-557-7229

PRAIRIE NURSERY
P.O. Box 365
Westerfield, WI 53964
608-296-3679

SANDY MUSH HERBS
Route 2, Surrent Cove Road
Leicester, NC 28748
704-683-2014

THOMPSON AND MORGAN
Box 1308
Jackson, NJ 08527
201-363-2225

TREES & SHRUBS

CAMELLIA FOREST NURSERY
P.O. Box 291
Chapel Hill, NC 27514
919-967-5529

CARROLL GARDENS
444 East Main Street
Westminster, MD 21157
301-848-5422

FOREST FARM NURSERY
990 Tetherow Road
Williams, OR 97544
503-846-6963

GOSSLER FARMS NURSERY
1200 Weaver Road
Springfield, OR 97477
503-746-3922

GREER GARDENS
1280 Goodpasture Island Rd.
Eugene, OR 97477
503-686-8266

HERONSWOOD NURSERY
7530 288th Street NE
Kingston, WA 98346
206-297-4172

HOLBROOK FARMS NURSERY
Rte. 2, Box 223B
Fletcher, NC 28732
704-891-7790

MONTROSE NURSERY

P.O. Box 957
Hillsborough, NC 27278
919-732-7787

NICHE GARDENS

111 Dawson Road
Chapel Hill, NC 27516
919-967-0078

POWELL'S GARDENS

Rte. 3, Box 21
Princeton, NC 27569
919-936-4421

ROSLYN NURSERY

211 Burrs Lane
Dix Hills, NY 11746
516-543-9347

SALTER TREE FARM

Rte. 2, Box 1332
Madison, FL 32340
904-973-6312

SPRINGDALE FARM NURSERY

Mozier Hollow Road
Hamburg, IL 62045

WASHINGTON EVERGREEN NURSERY

P.O. Box 388
Brooks Branch Road
Leicester, NC 28748
704-683-4518

WAYSIDE GARDENS

Hodges, SC 29695-0001
800-845-1124

WE-DU NURSERY

Rte. 5, Box 724
Marion, NC 28752
704-738-8300

WOODLANDER'S NURSERY

1128 Colleton Avenue
Aiken, SC 29801
803-648-7522

VIOLA LABORADORICA

CARROLL GARDENS

444 East Main St., Box 310
Westminster, MD 21157
301-848-5422

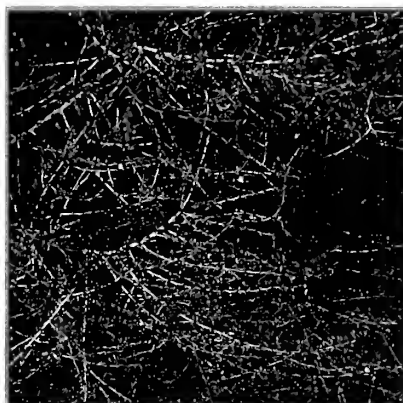
LAMB NURSERIES

E. 101 Sharp Avenue
Spokane, WA 99202
509-328-7956

LOGEE'S GREENHOUSES
55 North Street
Danielson, CT 06239
203-774-8038

DAYSTAR
Route 2, Box 250
Litchfield, ME 04350
207-724-3369

WINTER'S HIPS, FRUITS & BERRIES



STEPHEN SCANNIELLO

Cottoneaster



STEPHEN SCANNIELLO

Rose hips



ELVIN McDONALD

Crataegus 'Winter King'



STEPHEN SCANNIELLO

Ilex berries

RICE CREEK GARDENS
1315 66th Ave., NE
Minneapolis, MN 55432
612-574-1197

WAYSIDE GARDENS
Hodges, SC 29695-0001
800-845-1124

ELVIN McDONALD



Malus 'Red Jade'

ELVIN McDONALD



Lonicera maackii podocarpa

ELVIN McDONALD



Pyracantha

ELVIN McDONALD



Viburnum sp.

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